ELECTRICAL WEST

December 1951
25 Cents

What Our Employees Think, Page 65
Appliances, Page 96

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

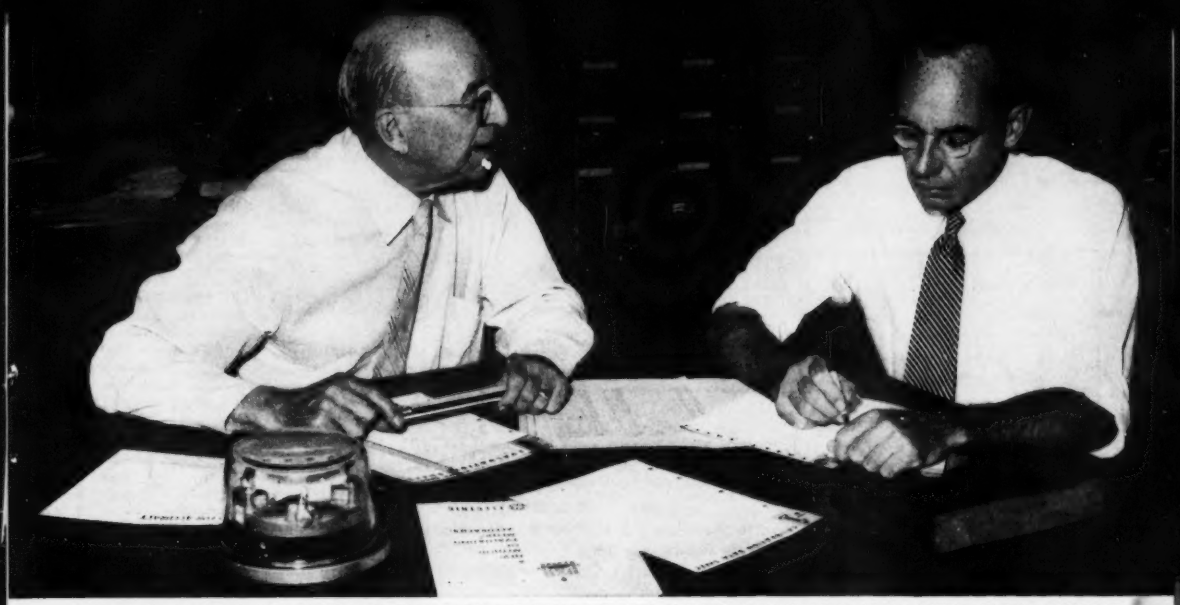
a range of features!
automatic home laundry
now's the very best time to buy an electric home freezer
ELECTRIC HOME FREEZER
Electrical Times
OF COURSE—IT'S ELECTRIC

all told!

PICTURED HERE are some recent issues of an advertising medium which we think is unsurpassed for intensive coverage of the appliance market in Central and Southern California. It's Edison's popular "Electrical Times," enclosed with the bills for electric service sent to Edison domestic customers.

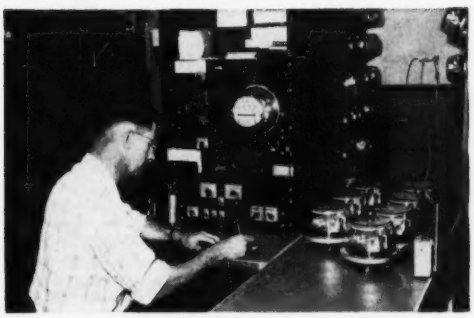
Each issue of "Electrical Times," has interesting stories about the use of electricity in homes, offices and factories, and on farms, and photographic stories show appliances used in both practical and unique ways and settings.

Probably many customers in your store are "Times"-directed. Because when an appliance is publicized in "Electrical Times" the message reaches every home in Edison service territory. That adds up to nearly three million people—all told!



METER SUPERINTENDENT W.C. QUANDT DISCUSSES BAR X AND SIGMA METER EVALUATION METHOD WITH L. RAGLE, PUEBLO DISTRICT MANAGER

Western Utility Adopts Meter Evaluation Method



TEST DATA for single-phase meters are recorded to nearest 0.1% by Southern Colorado Power Company meter tester.

USING EVALUATION FORMS, Meter Superintendent Quandt calculated Bar X (average accuracy) and Sigma (accuracy distribution). He found the method best for analyzing accuracy.

Southern Colorado Power finds Bar X, Sigma method best for analyzing accuracy of watthour meters

Southern Colorado Power Company became one of the first utilities to adopt the Bar X (average accuracy) and Sigma (accuracy distribution) method for evaluating meter test data.

Reports Meter Superintendent W. C. Quandt, "We have found that this method offers an excellent means for quickly reducing masses of test data to a simple, understandable form. Now, we can evaluate and compare groups of meters on a highly factual basis. That's why we are using and recommend this method."

General Electric uses this method in factory certifying I-50 meters. The limits are: Bar X within ±0.1% and Sigma within 0.15% on full load and 0.20% on light load. Also, 99.9% free from defects that might cause improper registration or operation. For complete information, call your G-E representative or write for bulletin GED-1408; Section 601-79, General Electric, Schenectady 5, New York.

SEND TODAY FOR COMPLETE SET OF METER EVALUATION FORMS

Section 601-79
General Electric Co.
Schenectady 5, N. Y.

Please send me a set of evaluation forms (GEZ-332) ☐
plus a descriptive brochure (GED-1408). ☐

NAME_____ POSITION_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

GENERAL ELECTRIC

With Factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities

DECEMBER 1951

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-third year of publication

VOL. 107 NO. 6

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Assistant Editor — John Coetz, Typography

NEXT MONTH

Coming up for January are a number of good features. There will be an article telling how two hydro plants were made automatic and placed under supervisory control. Use of isotopes in measurement of water content of snow for forecasting water supply has progressed to the point where there is now an installation using automatic radio transmission of information.

Another article will deal with a utility storeroom and service center functionally designed to speed service and cut costs.

Use of electric heat at the bottom of oil wells to increase flow from low-producing wells is something new with great potential. How heat is applied and its results make an interesting story. How unit substations and other package units save the time of designing engineers and purchasing agents in industrial wiring is a good economic story.

What are the latest developments in the field of fluorescent ballasts? That question will be answered in a comprehensive review of this whole subject.

A planned development in editorial policy is an expansion of the contractors' news letter to three or four pages instead of two as at present. Associationwise, look for a report on the PCEA Hawaiian Section Conference.

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Cover photo: Street scenes like this one on the Utah Power & Light Co. system are being seen in some parts of the West again this Christmas.

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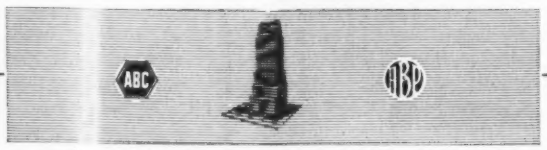
Chicago (11) — Michael I. O'Connell, 520 N. Michigan Ave.
Cleveland (15) — Frank J. Seiler, 1510 Hanna Bldg.
Los Angeles (17) — Carl Dysinger, 1111 Wilshire Blvd., MA 6-4323
New York (18) — Walter Klein, 330 W. 42nd St.
San Francisco (4) — Tom Carmody, Dick Alcorn, 68 Post St., DO 2-4600



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Quiet as a kitten

ELIMINATE NOISE AND RADIO TROUBLES ON 24.9 GR.Y/14.4 KV SYSTEMS WITH THIS L-M ROUND-WOUND TRANSFORMER

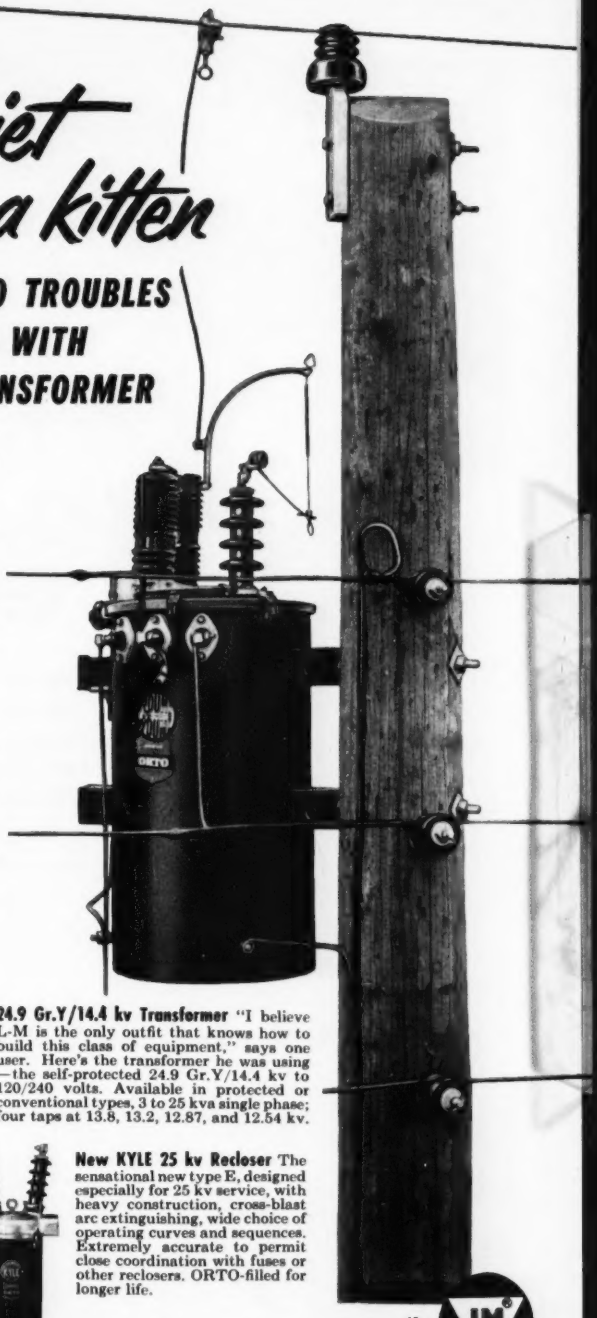
Loose cores and leaky bushings can make lots of trouble on 24.9 Gr.Y systems. Some cores get loose and hum annoyingly. The radio noise from a poorly designed bushing can drown out a distant broadcasting station—which doesn't make the neighbors happy.

L-M has built a Round-Wound® transformer especially for this service—with a core that's quiet as a whisper—it is wound from continuous strip steel, and not cut; it stays quiet!

Oil-filled bushings are specially designed and processed—they give NO radio interference.

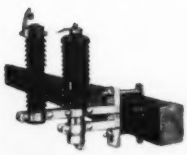
Like all Round-Wound transformers, this one has a high impulse level and high overload capacity.

The transformer and coordinated equipment have all been thoroughly tested in actual use in a number of locations throughout the country; they offer long life and dependable, economical service. Ask the L-M Field Engineer who calls on you for all the details; or write Line Material Company, Transformer Division, Zanesville, Ohio (a McGraw Electric Company Division).



24.9 Gr.Y/14.4 kv Transformer "I believe L-M is the only outfit that knows how to build this class of equipment," says one user. Here's the transformer he was using—the self-protected 24.9 Gr.Y/14.4 kv to 120/240 volts. Available in protected or conventional types, 3 to 25 kva single phase; four taps at 13.8, 13.2, 12.87, and 12.54 kv.

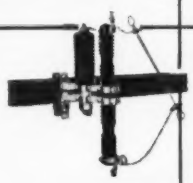
COMPLETE COORDINATED EQUIPMENT FOR 24.9 GR.Y/14.4 KV SYSTEMS



Heavy Duty Expulsion Arrester Type PF-3, 18 kv with 65,000 amp surge capacity, gives dependable protection to transformer and system.

New 24.9 Gr.Y/14.4 kv Cutout Swivel type hanger; double entrance contacts permit fusing from either side. Silver-plated solid phosnic bronze spring and contact assembly—no steel core to nick and rust!

New KYLE 25 kv Recloser The sensational new type E, designed especially for 25 kv service, with heavy construction, cross-blast arc extinguishing, wide choice of operating curves and sequences. Extremely accurate to permit close coordination with fuses or other reclosers. ORTO-filled for longer life.



Combination Arrester and Cutout Choice of swivel hanger for crossarm mounting, shown here; or for transformer mounting (shown on transformer above), top can be rotated to assure vertical fuse mounting on any size or make transformer regardless of tank diameter.

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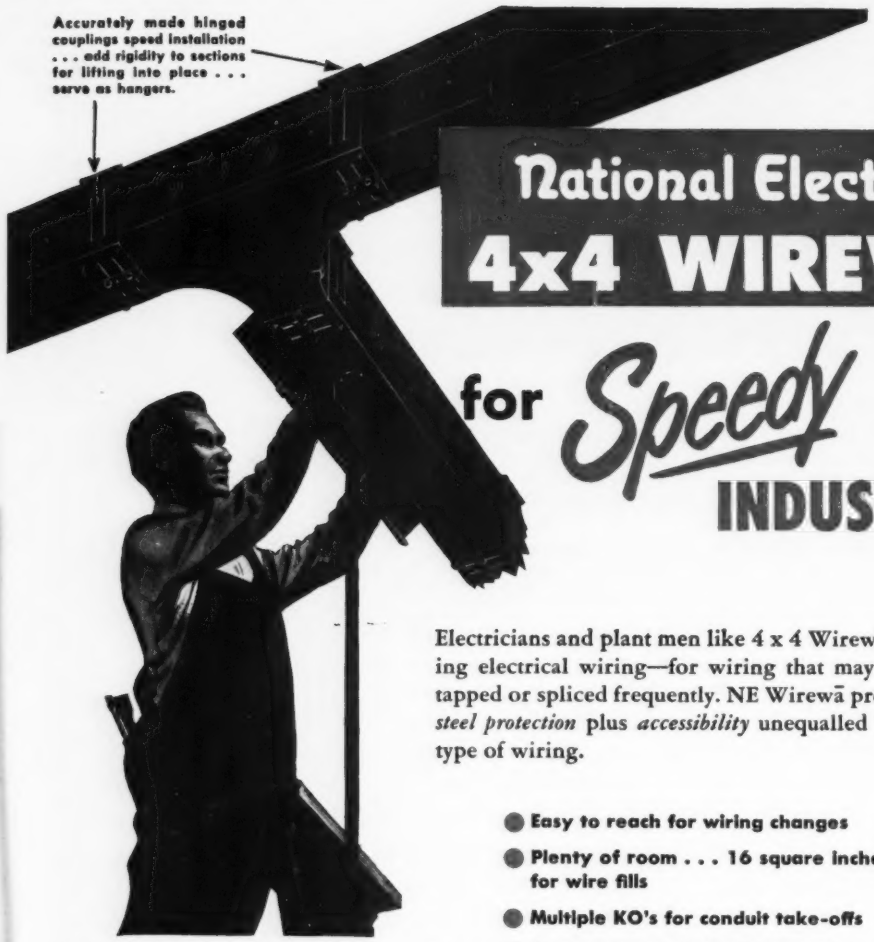
LINE MATERIAL —Transformers

Complete Coordinated Equipment for Distribution Today


Accurately made hinged couplings speed installation . . . add rigidity to sections for lifting into place . . . serve as hangers.

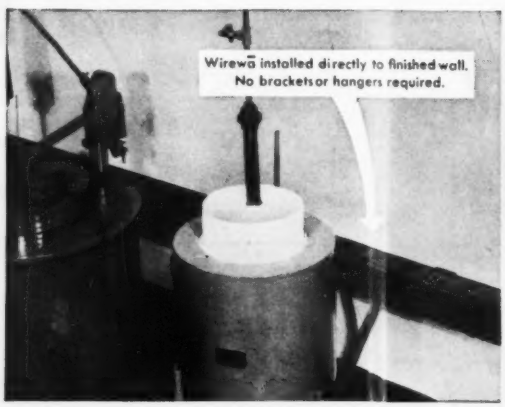
National Electric 4x4 WIREWĀ

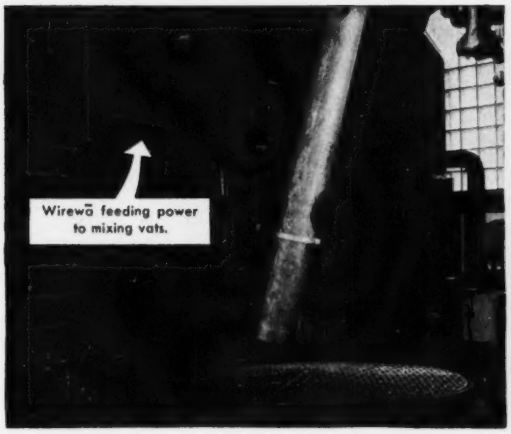
for *Speedy* INDUSTRIAL

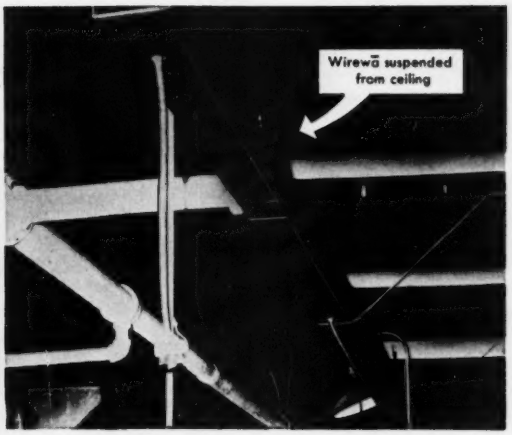
Electricians and plant men like 4 x 4 Wirewā for protecting electrical wiring—for wiring that may be changed, tapped or spliced frequently. NE Wirewā provides *rugged steel protection* plus *accessibility* unequalled by any other type of wiring.

- **Easy to reach for wiring changes**
- **Plenty of room . . . 16 square inches of wireway for wire fills**
- **Multiple KO's for conduit take-offs**
- **Quick, easy to install. Complete line of fittings**
- **Low maintenance**
- **Easy to reroute and extend . . . 100% salvable**

A Wirewā you'll like!

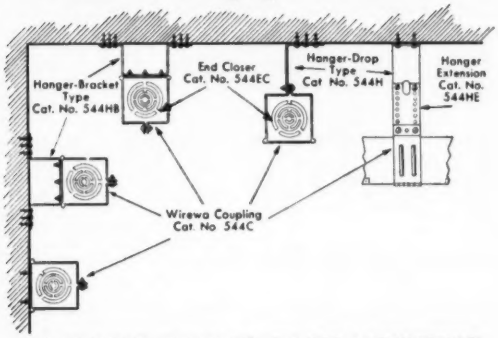






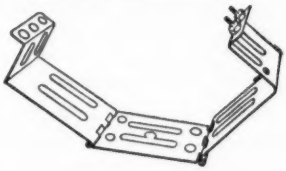
WIRING, EXTENSIONS and RELOCATIONS

Methods of Hanging 4x4 Wirewā


Hanger-Bracket Type Cat. No. 544HB
End Closer Cat. No. 544EC
Hanger-Drop Type Cat. No. 544H
Hanger Extension Cat. No. 544HE
Wirewa Coupling Cat. No. 544C

COUPLING PERMITS FLUSH MOUNTING

Hinged coupling speeds installation. Simply place around sections to be joined. Tighten two bolts. Three sides flat.



4x4 WIREWĀ FILL TABLE
ALL ONE SIZE WIRE

Wire Size	Area of Rubber Covered Wire—Square Inches		Maximum Number of Wires—All of One Size	
	Types R, and RH	Types T, and TW	Types R, and RH	Types T, and TW
14	.023	.013	139*	246*
12	.027	.017	118*	188*
10	.046	.022	69*	145*
8	.076	.040	42*	80*
6	.123	.081	26	39*
4	.16	.108	20	29
2	.21	.147	15	21
1	.27	.202	11	15
1/0	.31	.236	10	13
2/0	.35	.278	9	11
3/0	.41	.328	7	9
4/0	.48	.390	6	8
250M	.59		5	
300M	.68		4	
400M	.83		3	
500M	.98		3	

No. 14 to 8, solid wire; No. 6 and larger, stranded.
*Maximum number of conductors limited to 30, except as noted in N.E. Code.

Listed by Underwriters' Laboratories, Inc.

Sold through electrical wholesalers everywhere.

EVERYTHING IN WIRING POINTS TO

National Electric
PRODUCTS CORPORATION

1308 CHAMBER OF COMMERCE BLDG. • PITTSBURGH 19, PA.

2-Way Radio

Stringing conductor for 114,000 volt line from a barge in the Susquehanna River. Truck pulls wire from center of river because electrified railroad tracks on both banks prevent proper start from ground. General Electric 2-way radio in car on barge facilitates river-to-shore communication, greatly reduces danger to personnel.

Remote station transmitter is used by the foreman who makes his radio report from a distance of 40 miles. Compact, shelf-mounted unit has a power output of 50 watts.

Lineman's confidence is increased when voice contact with dispatcher is as near as the mike on the dashboard. Reports and instructions are exchanged instantly by General Electric 2-way radio.

At METROPOLITAN EDISON COMPANY

FASTER COMMUNICATION MEANS BETTER SERVICE!

Pennsylvania Utility Uses General Electric Mobile Radio for All-Year Dependability

LIKE all companies that sell service, electric utilities fight a common enemy—time. To reduce the time lag between outage and restoration, to give better service to the customer, is a constant, year 'round problem.

General Electric has the answer. It is *mobile radio*—2-way voice communication *instantly*—from car to car in motion, or between fixed and moving points. G. E.'s FM radio beam needs no wires, rides above static, brings in voices clearly and evenly in any weather.

It is a matter of record that G-E radio systems are cutting costs for utilities every day. Metropolitan Edison of Pennsylvania is one enthusiastic customer. You'll find others in all sections of the United States and Canada.

G. E. will survey and engineer to fit your terrain and your individual needs. If you're looking for better, faster methods of communication, get in touch with us. *General Electric Company, Electronics Park, Syracuse, New York.*

Faster dispatching by radio routes service vehicles to jobs with minimum delay, increases overall efficiency. Utilities everywhere have used General Electric radio for years, consider it an indispensable tool in all mobile operations. Frequently, the time and money saved in one emergency pays for the entire radio system.

Emergency use of radio is illustrated where wire is repaired after severe sleet storm in eastern Pennsylvania. G-E radio in truck, right, was only communication between workmen and dispatching office.

Immediate action in any weather is an important feature of G-E radio equipment. Delay is costly to utilities, can be minimized by 2-way system.

District Operating Superintendent Clyde Lenhart keeps in touch with river crossing operation via car radio from east bank of Susquehanna.

FOR CIVIL DEFENSE, *too, your radio system can contribute to public safety. Your G-E communications man will explain how. Ask him about it.*

FREE—Complete information on G-E 2-way radio systems and how they operate to your advantage. We will send you literature on request. Write: *General Electric Co., Section 20121, Electronics Park, Syracuse, N. Y.*

You can put your confidence in—

GENERAL ELECTRIC

THE TWO E·M·T FITTINGS

THAT ARE EASIER TO USE— SAVE MONEY TOO!

Cross Section Showing Indentations.

Easier to use and neater in appearance, Briegel All-Steel Indenter Fittings not only make stronger connections but also make each job more profitable. Contractors the world over recognize their cost cutting qualities and the fact that they make each wiring job a better job. It is only natural that Briegel Fittings are the most widely used E.M.T. connectors and couplings.

BRIEGEL METHOD TOOL CO.

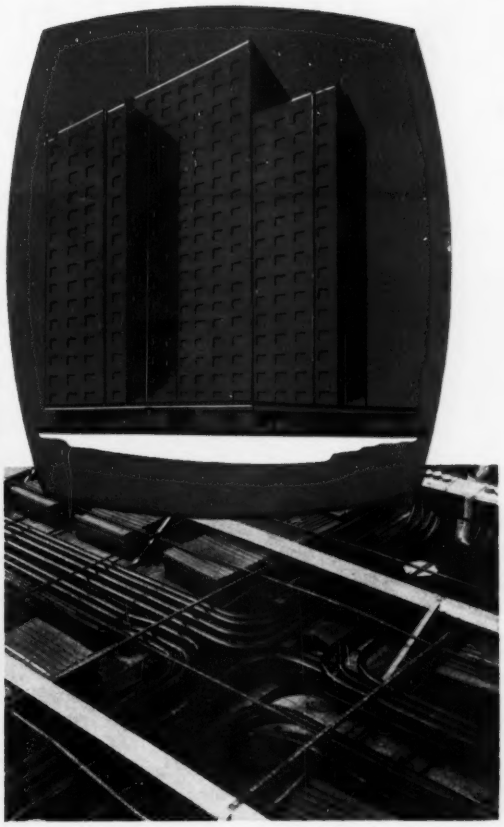
GALVA, • ILLINOIS

Distributed by

The M. B. Austin Co., Northbrook, Ill.; Clayton Mark & Co., Evanston, Ill.; Clifton Conduit Co., Jersey City, N. J.; General Electric Co., Bridgeport Conn.; The Steelduct Co., Youngstown, Ohio; Enameled Metals, Pittsburgh, Penn.; Wagner Malleable Products Co., Decatur, Ill.; Kondu Mfg. Co., Ltd., Preston, Ont.

SPANG CENTRAL CONDUIT

carries Power, Light and Communication Networks in PITTSBURGH'S ULTRA-MODERN CARLTON HOUSE



Architect:
F. Wallace Dixon
Consulting Engineer:
Karsunky, Weller & Gooch
Owner and General Contractor:
Ring Building, Inc.
Electrical Contractors:
E. C. Ernst, Inc. and
The Howard P. Foley Co.,
Joint Venturers

Newest hotel in the expanding steel capital, Carlton House will play an important part in Pittsburgh's future as a center of business and social activities. In its construction every effort was made to provide the most advanced facilities and services.

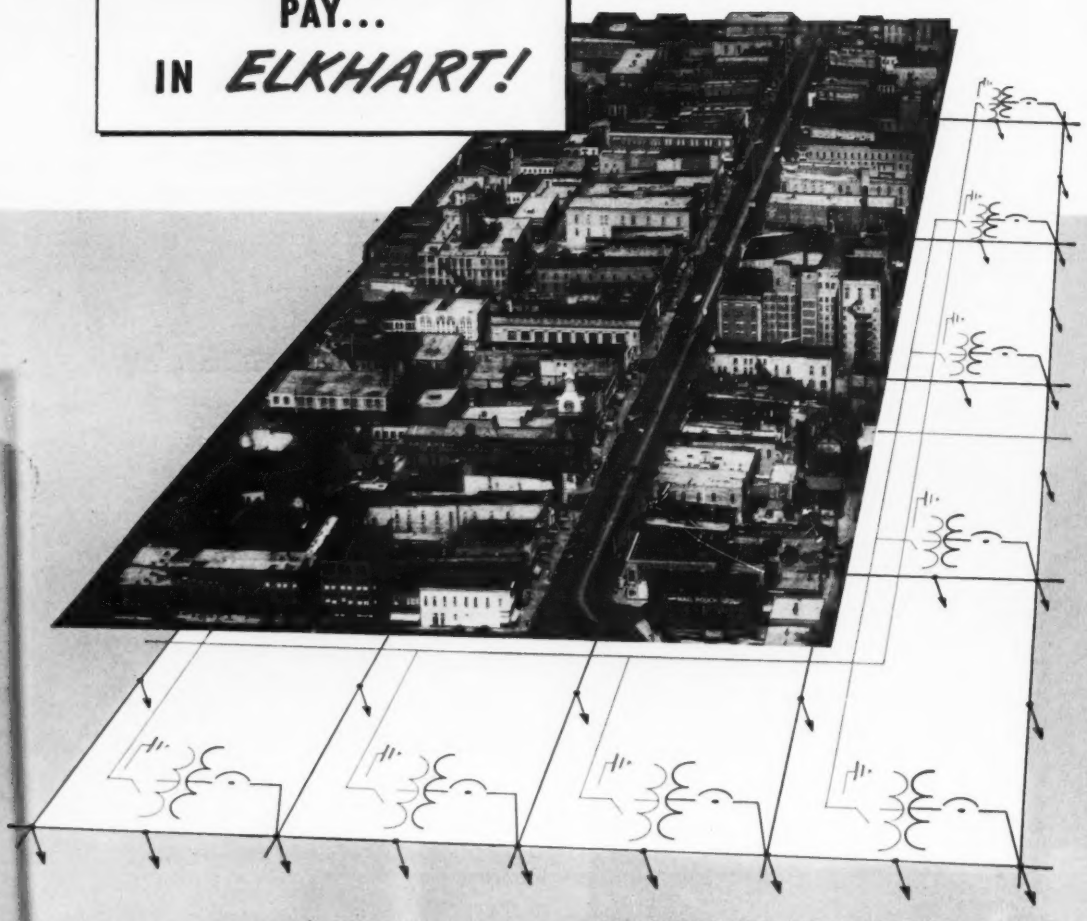
Throughout this ultra-modern structure a Spang Central Conduit system carries the vital electrical and communications wiring—a typical example of the dependence architects and contractors place on Spang quality and workability for use in major building projects.

In Carlton House you'll find Spang "Cenlaco" and "Central Black." In other new buildings on Pittsburgh's modern panorama contractors are installing all types of Spang Central Conduit. These Spang-Chalfant products are available through leading distributors, everywhere—ask for them by name.

SPANG

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
GRANT BUILDING, PITTSBURGH 30, PA.
District Offices and Sales Representatives
in Principal Cities

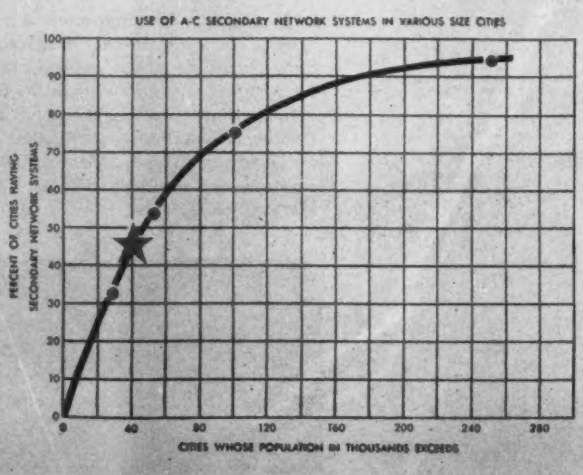
NETWORK SYSTEMS PAY... IN *ELKHART!*



FACTS ABOUT ELKHART'S A-C SECONDARY NETWORK SYSTEM.

The secondary network system is supplied from 13 vaults having a total capacity of 3,900 kva. The area covered by Elkhart's network is almost 20 square blocks, containing 3.61 miles of conduit, 5.47 miles of primaries and 2.27 miles of secondary feeders.

One third of all cities in the United States with a population of 25,000 or more have network systems, while one half of all cities with a population of 50,000 or more have network systems.



17 years' uninterrupted service... no voltage-regulation problems

There's no power service problem in the business district of this bustling Indiana town of 40,000 . . . they took care of that 17 years ago. Then, Elkhart was struggling with an overloaded radial system, consisting of 3-phase primaries and both 3-phase and single-phase secondaries . . . tranformers were mounted on practically every pole. The Fire Department and fire underwriters were concerned . . . the utility was plagued with voltage-regulation problems.

OVER AND UNDER . . . In 1934 the Indiana and Michigan Electric Company met the problems of Elkhart's business district by installing an *A-C Secondary Network System.* Transformers and primaries were placed underground . . . the secondaries and services overhead. This overhead and underground combination, particularly applicable to smaller cities and towns, made possible great economy in the original installation cost.

IMPROVED SERVICE . . . The A-C Secondary Network System has resulted in a high standard of continuity of service and uniformly good voltage-regulation, not attainable through radial distribution systems. Underground placement of the primaries and transformers has greatly reduced congestion and improved appearance.

ABOUT MAINTENANCE . . . Maintenance story here is typical of all users of secondary networks . . . it's low, almost negligible. The utility reports that in 17 years of operation, there has never been a complete interruption of the system. Underground crews like the convenience of maintaining the system. They know . . . they work with the equipment.

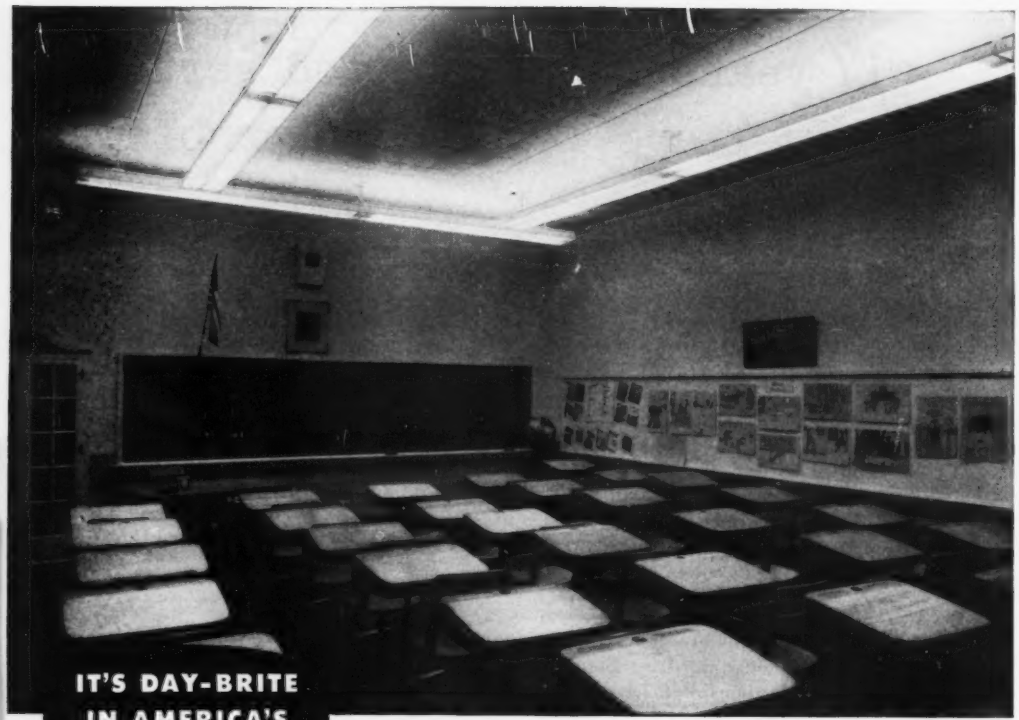
CUSTOMERS AND UTILITIES BENEFIT . . . Utility customers appreciate the high-quality service and uniformly good voltage-regulation afforded by network service. The utility benefits from reduced operating and maintenance expense and improved customer good will. Large or small, your town can have high-quality network service . . . at a cost commensurate with the benefits this service affords. Westinghouse makes this equipment and can help in your planning. Call or write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-97155

YOU CAN BE SURE... IF IT'S Westinghouse

NETWORK EQUIPMENT

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.



Anyone Can See Why Children Learn in this School

The North Glendale School in Glendale, Missouri is still another school, one of hundreds throughout America—where Day-Brite supplies modern efficient lighting.

Do teachers in your school look at a group of young *squinting* faces? Do your classrooms have a last row problem? Are your blackboards "glareboards"? Then you should do something about your school lighting now. Glare, bright reflected light, sharp color contrasts or insufficient light can cause permanent damage to strained eyes . . . does result in nervous tension and retarded learning.

Day-Brite has conducted scientific school lighting tests for years. That's why they have been able to solve school lighting problems for teachers, school principals and Public School Systems in literally hundreds of America's schools. That's why Day-Brite fixtures give classrooms the glare-free, evenly distributed light that students need. And, that's why Day-Brite has been able to design quality fixtures with the low-cost installation and maintenance features which most school budgets require. Would you like further information? Write today to Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis, Mo.

NOW, MORE THAN EVER

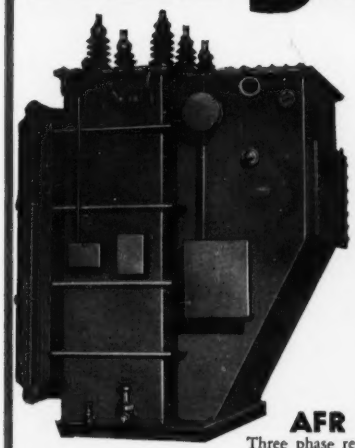
AMERICA MUST SEE WHAT IT'S DOING

IT'S EASY TO SEE WHEN IT'S

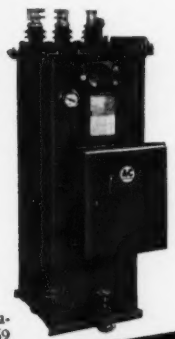
"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

133

Large or Small-



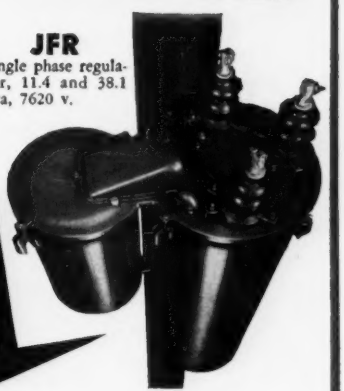
DFR
Single phase regulator, sizes through 6900 v, 250 kva.



AFR
Three phase regulator, sizes through 69 kv, 2500 kva.

ALLIS-CHALMERS 5/8% STEP REGULATORS

JFR
Single phase regulator, 11.4 and 38.1 kva, 7620 v.



YOU GET THESE SAME plus features

7 QUALITY FEATURES YOU GET ON ALL ALLIS-CHALMERS REGULATORS

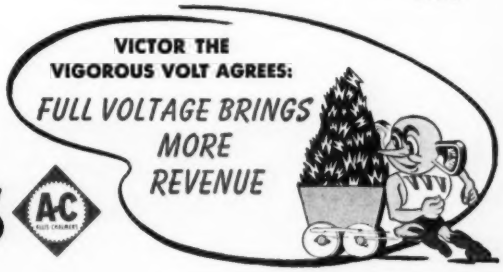
- ★ ⅝% steps
- ★ Close regulation (± 1 volt band)
- ★ Easy control adjustment. The same type of control used on all sizes
- ★ Close average voltage for all types of loads (maintained by voltage integrator)
- ★ Long life contacts of liberal design to withstand hundreds of thousands of operations
- ★ Tap changing drive mechanism with balanced spring action to eliminate shock . . . operates under oil for long trouble-free life
- ★ Unit construction to simplify maintenance

IN ADDITION to these important features, the single phase ⅝% step regulators require only 1/3 the exciting current of older types of single phase regulators. Low exciting current releases system capacity for useful loads.

You can count on Allis-Chalmers for regulation that helps boost capacity, increase revenue, and improve customer good will.

Get complete facts on Allis-Chalmers ⅝% step regulators from your nearby Allis-Chalmers district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

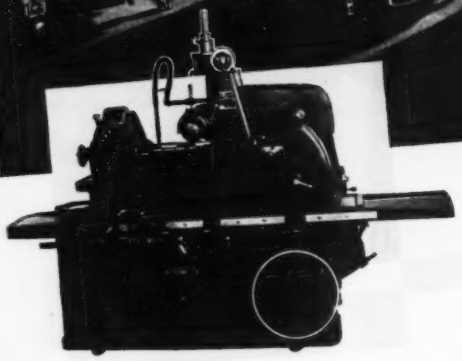
A-3540



ALLIS-CHALMERS

Originators of ⅝% Step Regulation

DESIGN LEADERSHIP



SQUARE D MOTOR STARTERS

SQUARE D's DESIGN LEADERSHIP is reflected in important features:

Generous wiring space . . . simple contact change . . . easy coil removal . . . additional electrical interlocks . . . long life . . . NEMA standardization . . . simplified maintenance. These are features which add up to an ever-increasing preference for Square D motor starters.

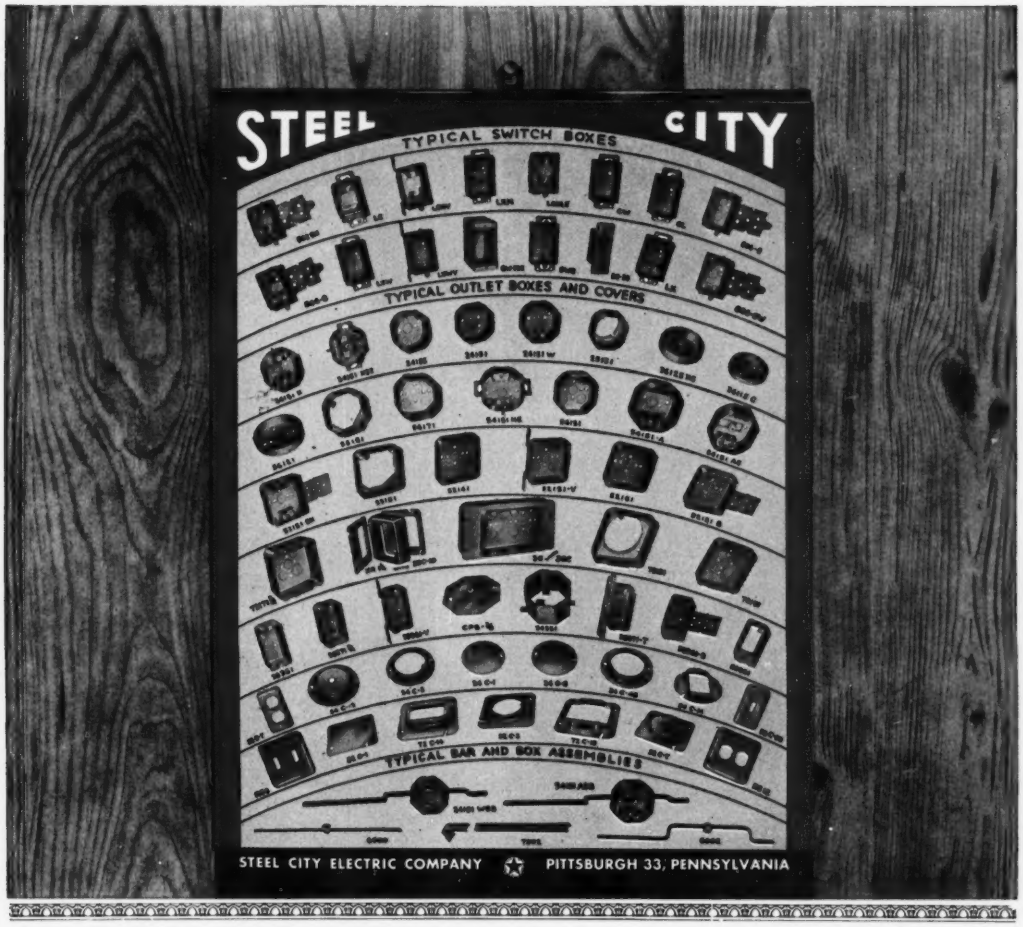
Write for BULLETIN 8536

Square D Company, 4335 Valley Blvd., Los Angeles 32, California

SQUARE D COMPANY

DETROIT · MILWAUKEE · LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.



On the wall OF YOUR OFFICE OR STOCK ROOM *This Hanger*

. . . picturing the most popular types of boxes and covers in **STEEL CITY'S COMPLETE LINE,** will prove helpful in making selections that will best meet your needs.

One - or more - of these attractive and informative hangers (16"x22") is yours for the asking.

Address your requests to . . .

SALES DEPARTMENT

Steel City Electric Co.

1207 COLUMBUS AVENUE, PITTSBURGH 33, PA.

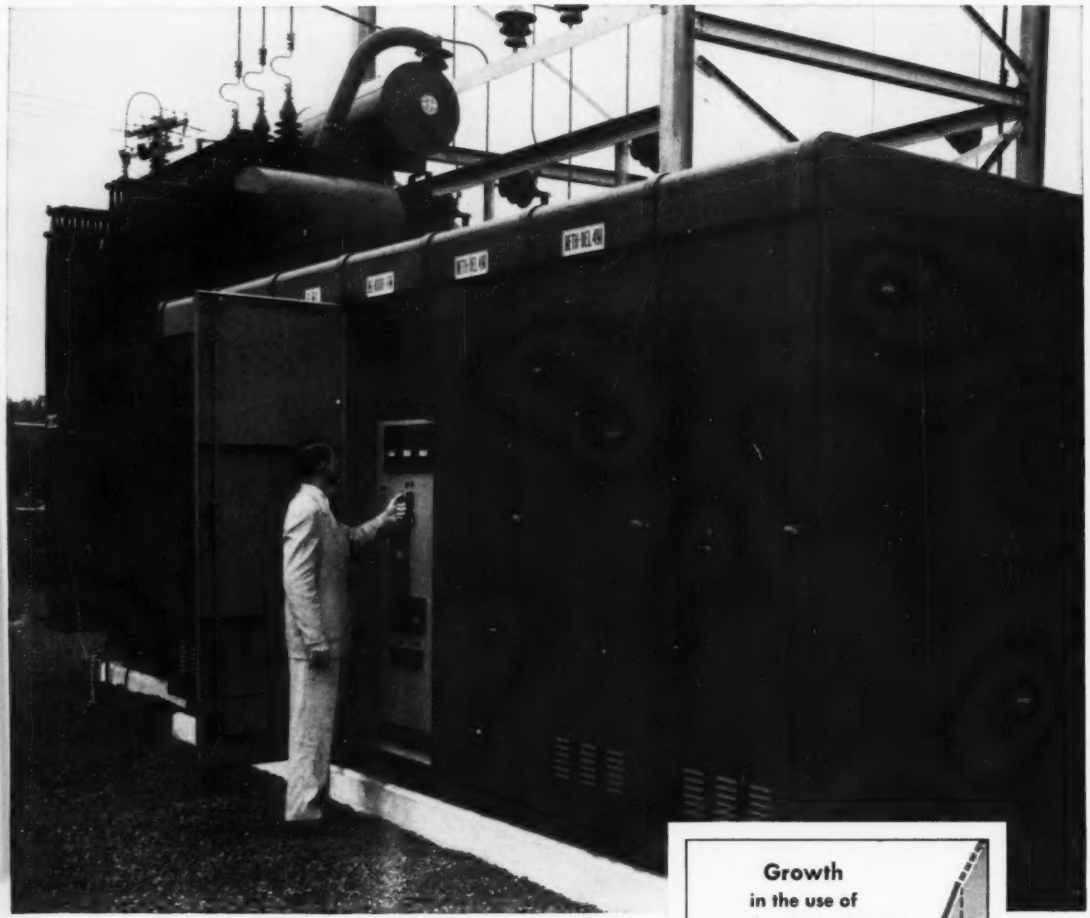
West Coast Representatives

MURPHY-HAIN COMPANY
720 E. Second Street
LOS ANGELES 12, CALIF.

HODGES & GLOMB
1264 Folsom Street
SAN FRANCISCO 3, CALIF.

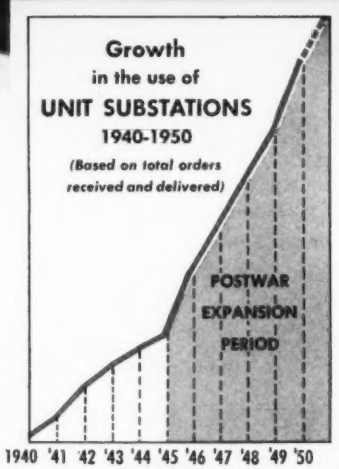
NORTHWESTERN AGENCIES
4130 First Avenue South
SEATTLE 4, WASH.

Niagara Mohawk EXPANDS FAST at



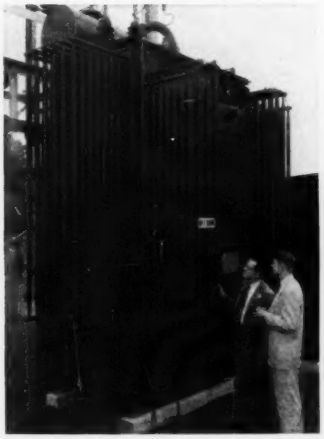
NIAGARA MOHAWK ADDS 10,000 quickly and easily with third and fourth G-E master unit substations (5000 kva each). The one above transforms 33 kv to 5.04 kv. Open compartment door shows operating panel for magne-blast breaker. More details in photos on opposite page.

WHAT DOES THIS TREND MEAN? Savings in time, money and materials are becoming more and more important. It also means that adaptable compact unit substations have proved to be perfectly suited in cases where "special designs" were thought necessary. You get plenty of flexibility when you use G-E packaged substations.

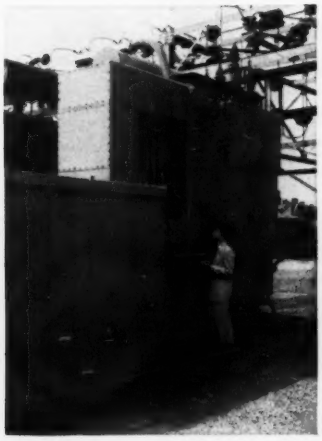


low cost—with G-E Unit Substations

CIRCUIT BREAKERS are safely and easily removed for inspection. This view shows rear of Niagara Mohawk's new G-E metal-clad transformer main breaker in operating position. Breaker cannot be lowered for removal until it is tripped and power circuit interrupted.



YEARS OF MAINTENANCE-FREE SERVICE ahead for transformers in Niagara Mohawk's new unit substation. Bus regulation of voltage is provided by load-ratio-control equipment. Experience shows G-E LRC equipment requires very little maintenance.



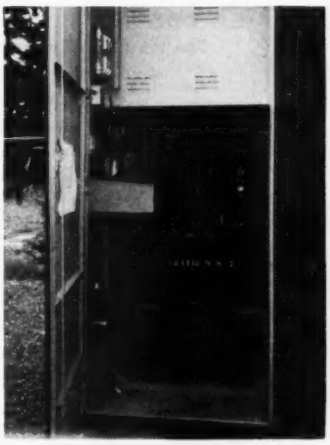
FORESIGHT PAYS OFF again and again. Above is section of older G-E master unit substation installed by Niagara Mohawk in 1939. Growing loads posed no problem—new unit (barely visible, upper left) installed alongside, capacity increased by 5000 kva.

Quick, easy ordering and installation help Niagara Mohawk expand fast to meet increased demand in Albany area

Like many other utilities and industrial plants, Niagara Mohawk Power Corp. has shown it pays to use "packaged" power equipment. In this locality, they've chosen a standard distribution system (in this case: primary network) and a standard load increment, or "building block" of power (5000-kva). As load grows, a duplicate substation of this capacity is tied into the system, always a jump ahead of demand.

A G-E unit substation arrives ready for use—you simply spot in place, connect, and energize. You save not only on equipment and installation costs, but also valuable engineering time to use for over-all planning.

These are just a few reasons for the fast-growing trend to unit substations shown in the chart on the opposite page. Your local G-E representative can show you plenty of others. Call or write him. *General Electric Company, Schenectady 5, N. Y.*



EXTRA $5000 SAVED BECAUSE OF FLEXIBILITY

IDEA TO SAVE MONEY: Photo above is close-up of G-E metal-clad auxiliary compartment, installed with rest of Unit Substation. Flexibility permitted Niagara Mohawk to install 48-volt battery, charger, telephone. By doing this instead of using special construction, Niagara Mohawk estimates they saved $5000 to $8000.

321-80

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

The miracles of modern electric illumination were all foreshadowed by the glow of Edison's first lamp—implicit in the great IDEA. Also implied in this, as in all epoch-making inventions, were the corollary imagination and effort of thousands of unpublicized successors—pioneers of America's vital electric illuminating industry.

KERITE insulation was well established before the turn of the century. Already famous in telegraphic and signal applications, Kerite quickly won recognition for safety, dependability, and ultimate economy in the infant lighting and power industry . . . for the transmission of electric power via aerial, underground, and submarine cable.

By conscientious workmanship, careful handling, and a continuing search for new and better applications of its unique formula, The Kerite Company has been able to anticipate the power industry's needs. It will continue to apply itself to the technical world of "ideas" in which now, as in Edison's day, the future of America's power still lives.

The Kerite Company, 30 Church St., New York 7, N. Y.
Chicago — San Francisco — Los Angeles

DAYS KERITE

KERITE CABLE

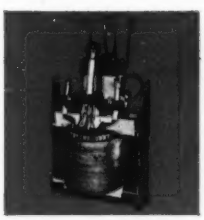
Kerite Insulation—Your Cable's Best Life Insurance

DESIGNED TO MEET YOUR NEEDS BETTER . . . AND MORE ECONOMICALLY!

The Moloney HiperCore CSP Transformer with wound cores of cold-rolled silicon steel combines superior operating characteristics with low maintenance costs. Operating records show the better voltage regulation and greater short-time overload capacity of the HiperCore Transformer.

The CSP equipment contributes to the low maintenance costs on these transformers. Not only are they protected against lightning surges and short circuits, but also against overloads which tend to shorten the life of a transformer.

CSP equipment consists of the following: Lightning arresters, primary fuses, tank grounding gaps (on tanks not solidly grounded), and secondary circuit breaker with indicating light (to indicate overload).



Simplicity of design of the core-and-coil unit plus liberal use of materials and adequate cooling ducts make HiperCore Transformers cooler operating and better performing, resulting in longer life under normal operating conditions.

CHECK THESE FEATURES of all HIPERCORE TRANSFORMERS

- ✓ **Excellent voltage regulation**
- ✓ **High short-time overload capacity**
- ✓ **Light weight**
- ✓ **Small size**
- ✓ **Long operating life**
- ✓ **Low temperature gradient**

ME51-17

MOLONEY ELECTRIC COMPANY

Manufacturers of Power Transformers • Distribution Transformers • Load Ratio Control Transformers • Step Voltage Regulators • Unit Substations

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONT., CANADA

ONLY TIREX
HAS THE
SELENIUM
NEOPRENE ARMOR

Only Simplex-TIREX cords and cables are jacketed with the famous Selenium Neoprene Armor. This famous cured-in-lead jacket is well known wherever tough, hard jobs are found. Whether it is coal mining, ship building, open pit mining operations, rock quarrying or foundry work the tough, cured-in-lead jacket provides the kind of staying power that you want. Wherever rough, abrasive conditions are found, there you will find the jobs that TIREX excels at doing.

Actual service records show that Simplex-TIREX cords and cables have proved to be the most economical because the Selenium Neoprene Armor lasts so long.

Whenever your requirements call for the use of a portable cord or cable, specify and be sure that you get Simplex-TIREX Cords and Cables.

If it isn't made by Simplex it isn't Tirex

Simplex - WIRES & CABLES

SIMPLEX WIRE & CABLE CO.
79 SIDNEY STREET,
CAMBRIDGE 39, MASS.

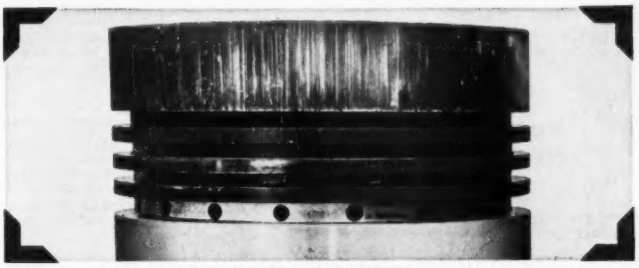
STANDARD ENGINEER'S REPORT

DATA

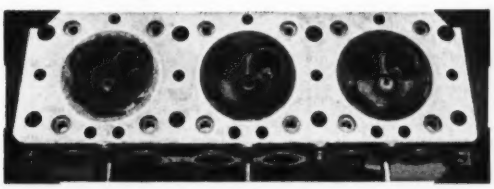
LUBRICANT	RPM Delo Oils
UNIT	Caterpillar D13000 diesel
OPERATION	Operating 75 KW generator
CONDITIONS	Constant speed – varied loads & temp.
PERIOD	2119 hours
FIRM	Lusitania, San Diego, Calif.

Ring-sticking stopped, wear cut in heavy-duty engine

AFTER 2119 HOURS on RPM DELO Supercharged-2 Lubricating Oil, this representative piston from a D13000 Caterpillar indicates the clean condition of lubricated parts of the engine. All 24 rings in the engine were free!

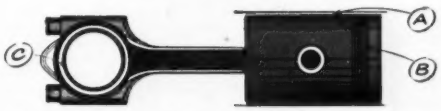


ONLY 0.0002 INCH WEAR PER THOUSAND HOURS was the average wear-rate on cylinders in the engine during the 2119-hour run, although usual drain periods were extended to 1000 hours. Oil temperatures averaged 175° F. to 180° F. Note the open oil-return holes and grooves (above) and lacquer-free piston skirt (left).



CYLINDER HEAD from the engine after the run. RPM DELO Supercharged-2 is recommended specially for heavy-duty engines where fuel-sooting or other deposits, high temperatures or other conditions cause operational problems and wear.

How RPM DELO Oils keep engines clean and prevent wear



A. Contain special additives that provide metal-adhesion qualities...keep oil on parts whether they are hot or cold, running or idle.

B. Anti-oxident resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean, helps prevent scuffing.

C. Special compounds stop corrosion of any bearing metal, and oil foaming in both wet and dry sump engines.

There is an RPM DELO Oil to meet every heavy-duty engine operation condition.

FREE BOOKLET on the RPM DELO Oils gives you complete information. Write or ask for it today.

RPM DELO LUBRICATING OILS

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA

Non-Metallic
FIXTURES

No. 179
Accommodates Standard 3¼" Globe

Entrance Light
NON-CORROSIVE!
NON-STAINING!

These fixtures are molded of Non-Corrosive and Non-Staining Bakelite. Thus they prevent the unsightly staining of the paint so often evident with the conventional metal fixtures.

On the sea coast where salt laden atmospheres rapidly destroy metal fixtures, UNION'S Non-Metallic fixtures are unsurpassed.

No. 169 is also Dust and Bug Proof, thereby eliminating the constant chore of globe cleaning.

Porch Light
BUG PROOF - VAPOR TIGHT
NON-CORROSIVE

No. 169
Fits 3¼ or 4" Box

UNION INSULATING CO.
PARKERSBURG, W. VA.

LETTERS TO THE EDITOR

Engineers and Politics

To the Editor:

Engineers as a rule are not very good politicians. They should be, and they should study politics with a greater interest. To a certain degree, the trouble with America today is that our most constructive minds are those that are trained along engineering lines and have been hard at work developing this country. There has been some very frank criticism that the training of an engineer has not been broad enough. To a certain degree I will concur, because, with broader training, the engineer would see the dangers of political intrusion into the realm of economics and fight it as hard as he fights fire, flood and other mishaps.

An engineer, however, is familiar with the theory of parallelogram of forces. At this time it strikes me that a number of forces are in such a point that they can be paralleled to result in a political housecleaning in this country—and never has it been more badly needed in our history.

At the present time the investment of the United States government in hydroelectric power development is tremendous. Many of these were not put forth as power developments, but under the guise of flood control, river and harbor improvements, aids to navigation, etc. But the net result has been, in a great many cases, hydroelectric plants and the sale and, often, the distribution by the government of electric power. Practically all these projects have been built under the auspices of the Department of the Interior or the Engineering Department of the War Department. But no matter how built, they vest in the hands of the administrative authorities of this country a vast chain of public utilities that should be in private ownership. The duty of the government is to control and regulate—not to operate. When the government operates, all control and regulation disappear because history has proved that no government will regulate itself.

The unions that have been closest to this development, namely, the IBEW of the AFofL and the Radio & Electrical Workers of the CIO, have already sensed this danger. And although they have not yet got to the point of advocating the return to private ownership of such property, they have both agreed, separately and independently of each other, that they would work to prevent any further encroachment by the federal government in hydroelectric development.

Here we have several forces:

1. The private investor in the public utility security
2. The individual who buys power and sees the danger of public ownership of power
3. The operating managers of privately owned utilities
4. The AFofL's IBEW
5. The CIO's Radio and Electrical Workers

I believe these forces could be teamed up to get before the people of the United States the problem of selling these properties back to privately owned companies—even if sold at a loss over the capital investment. And I believe they should be so sold because of the wasteful manner in which the federal government and other political organizations develop projects.

The net result would be profitable. First, the drain on the Treasury to support these utilities would be stopped; second, instead of being a drain upon the taxpayers, these utilities in private hands would be of assistance to the taxpayer because they would be bearing their portion of the tax burden.

With the wasteful and extravagant government in Washington and a tremendous drain upon our national economy, it behooves us to get everything out of the tax-exempt classification that can be properly got out.

The tax burden is now heavy. Calling the public's attention to the fact that these vast government-owned and operated utilities could be an asset to the taxpayers of this country rather than a liability, and showing how these liabilities could be turned into assets would be a great step forward in improving our national economy. And, for the first time in many years, labor itself would be willing to listen to such an argument. Previously it has stood out against it.

Walter J. Walsh
Attorney at Law
681 Market St.
San Francisco 5, Calif.

ALL KINDS
of SMALL
TRANSFORMERS

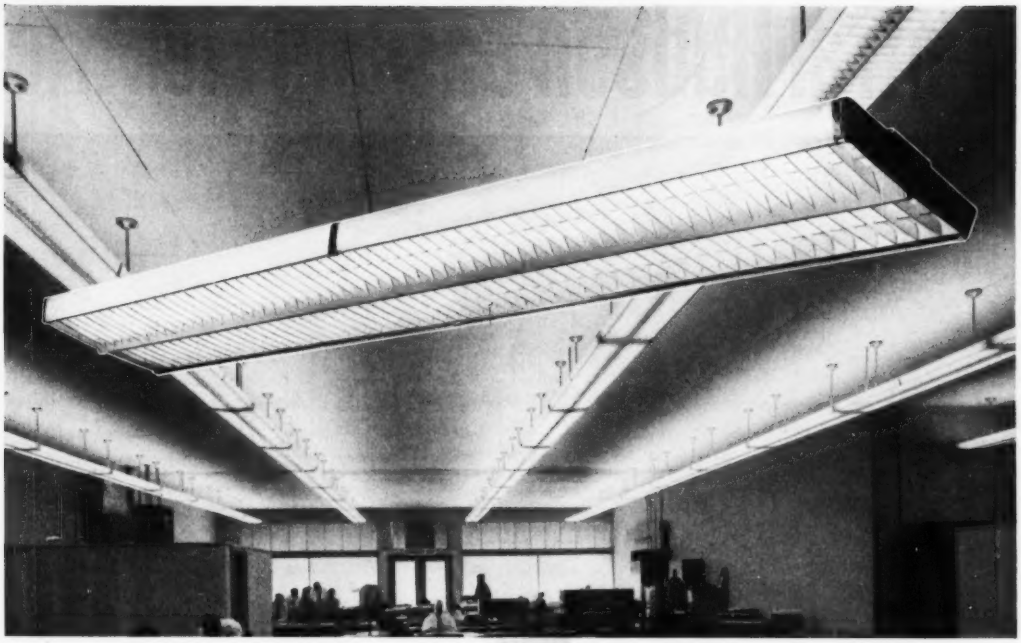
—in the JEFFRIES line

Practically all your small transformer needs are supplied by the Complete Jeffries line. We have specialized for years in providing transformers to exactly match your requirements. If not in our regular line, we build to meet your specifications in a hurry!

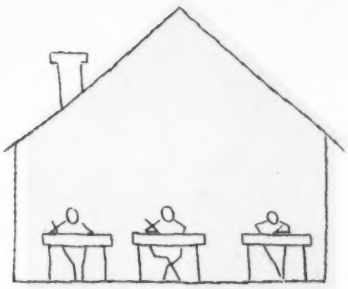
Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles 11, Calif.

Manufacturers' send us names and addresses of your Western representatives or sales outlets for free listing in April 1952 Manufacturers' Directory.

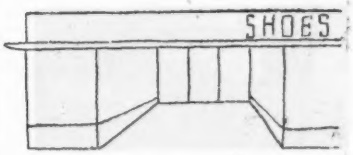


Typical installation of L1284-96, 430 MA units in the guided missile plant of Convair Aviation Corporation, Pomona, California.



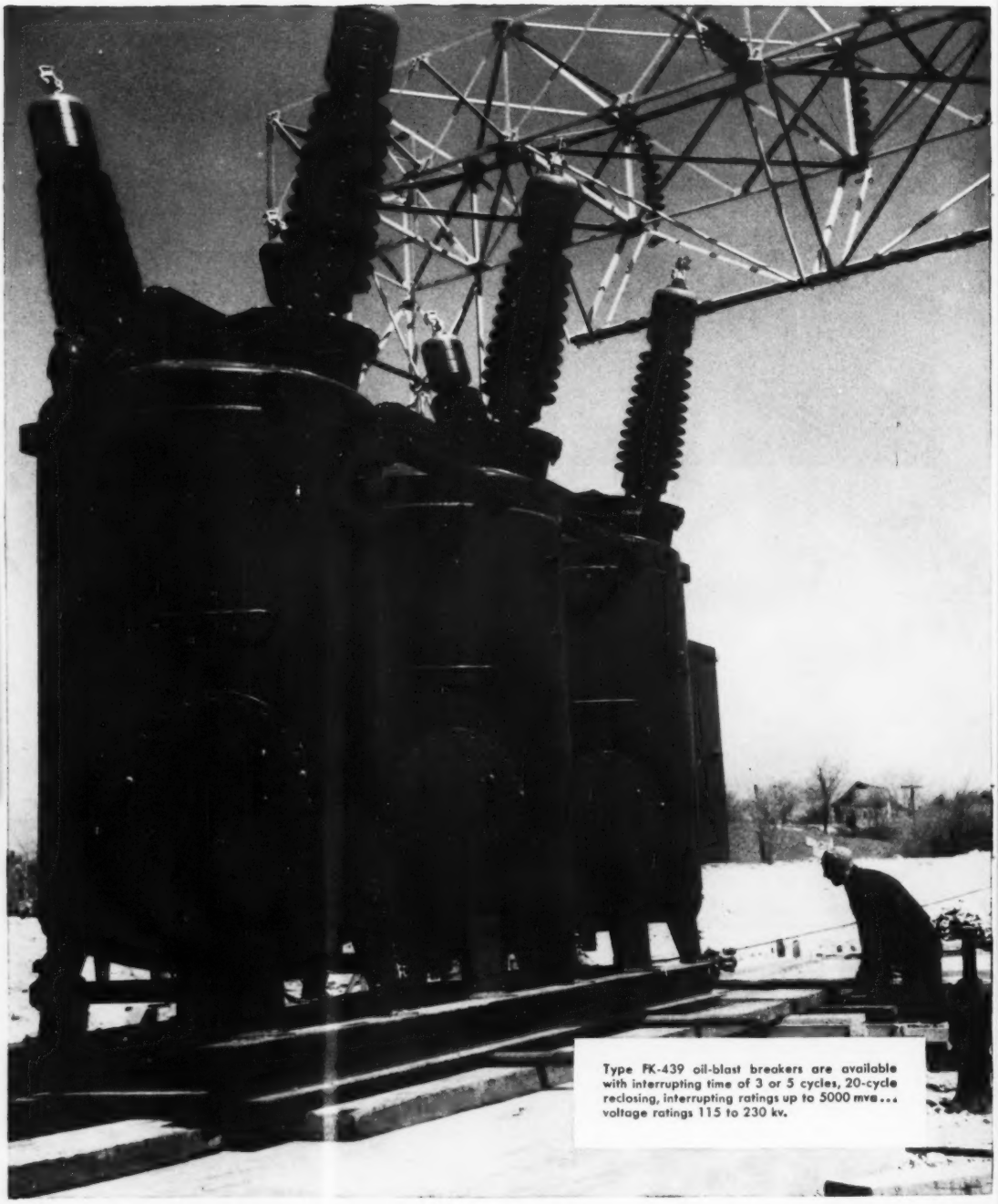
sunbeam's new L1280 series...designed to do an all around lighting job

Whether your current design project is a school, a multi-story office building, or a small retail store you can be sure of the best results in lighting when you specify Sunbeam's L1280 Series. The more than 30,000 units now in service throughout the nation is excellent proof of the versatility of this new Sunbeam fixture. Such features as its 82% efficiency...its low brightness (.6c/sq. in.) ...its ease of installation and maintenance all combine to provide a visionaire that does an excellent all around lighting job. For complete photometric and installation information write for Bulletin No. 664.



SUNBEAM LIGHTING COMPANY
777 EAST 14TH PLACE • LOS ANGELES 21, CALIF.

Central Hudson Gas and Electric



Type FK-439 oil-blast breakers are available with interrupting time of 3 or 5 cycles, 20-cycle reclosing, interrupting ratings up to 5000 mva... voltage ratings 115 to 230 kv.

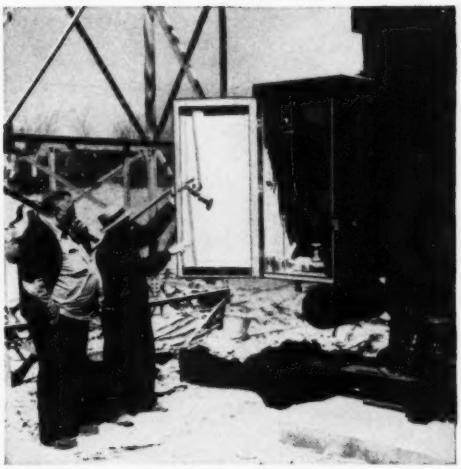
adds 33,000 kva of capacity

Type FK-439 oil-blast breakers protect new 110-kv system

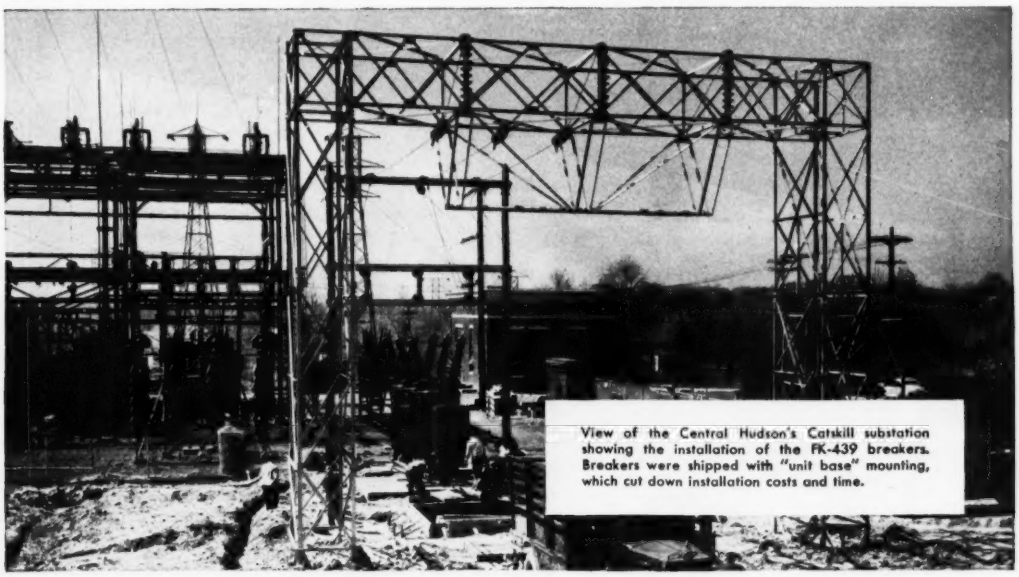
Recently Central Hudson Gas and Electric Corporation embarked on an expansion program to add 33,000 kva of capacity to its Catskill substation. Since plans called for changing high-line voltage from 66-kv to 110-kv, new circuit breaker equipment was necessary.

Company officials chose G-E Type FK-439 oil-blast breakers to protect the new installation. Multi-break interrupters and a dependable pneumatic operating mechanism provide high-speed performance and operating economy. Completely sealed bushings and accessibility of all internal parts simplify inspection and maintenance. Breakers were shipped with "unit base" mounting, which cut down installation time and expense.

Investigate these and the many other economic advantages to be realized when you use G-E switchgear on your system. Ask your G-E sales representative for further information on the FK-439 breaker, or write for Bulletin GEA-4407B, General Electric Company, Schenectady 5, N. Y.



Pneumatic operating mechanism is easily accessible. All working parts have an adequate margin of strength for safety and durability. Thoroughly tested and proved, built for dependable performance and operating economy.



View of the Central Hudson's Catskill substation showing the installation of the FK-439 breakers. Breakers were shipped with "unit base" mounting, which cut down installation costs and time.

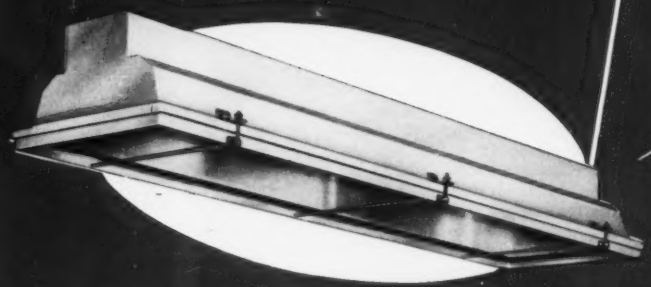
GENERAL ELECTRIC

859-13

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Notes on Quality **LIGHTING:**

Here in [illegible] assuring maximum lighting [illegible] with maximum service and maintenance is, by every standard of comparison, SMOOT-HOLMAN. The hallmark of quality in better buildings is the presence of SMOOT-HOLMAN equipment.



The New D-P Seal-Lux, *pictured above, is a vapor-tight fluorescent luminaire built for high efficiency and rugged service life under the most exacting conditions.*

1 Constellation Slimline fluorescent
2 D-P Line-Light
3 Collegiate Slimline fluorescent
4 Educator incandescent
5 RLM Standard Dome Reflector
6 The Master floodlight
7 LH Ceiling light

ILLUMINATION EQUIPMENT
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INGLEWOOD, CALIFORNIA
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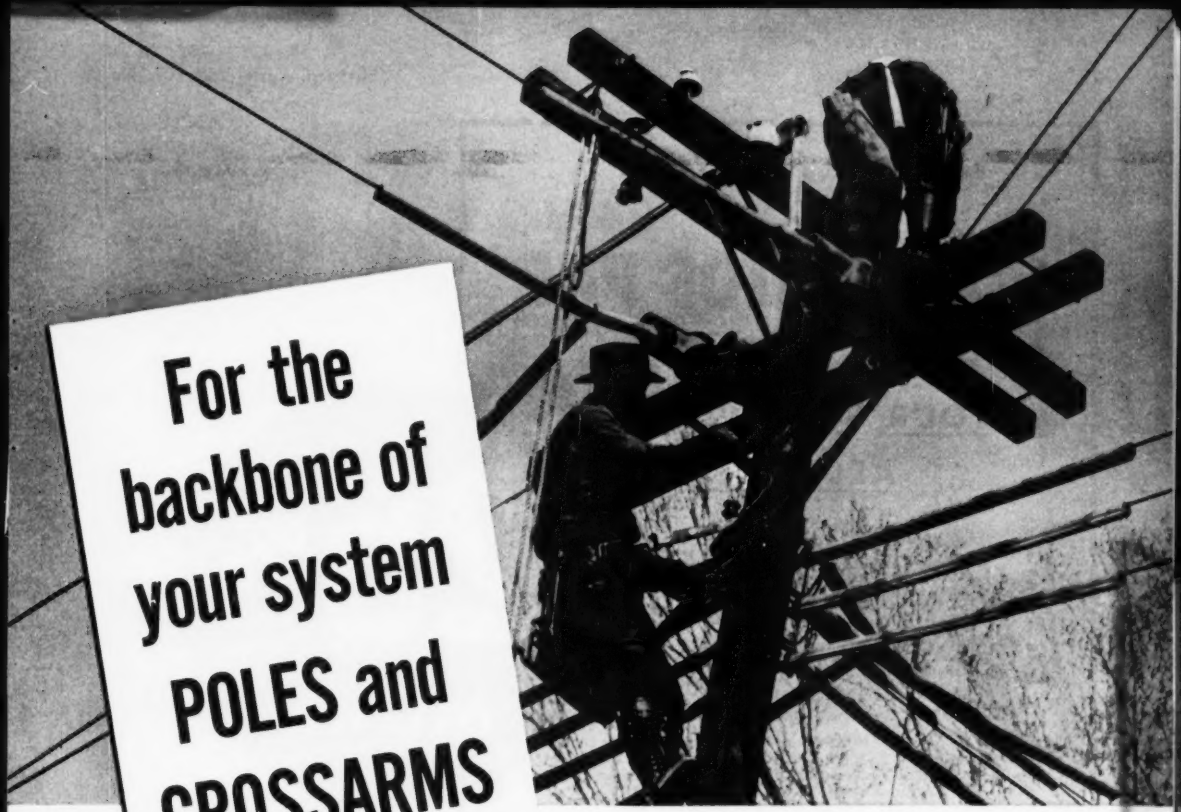
SMOOT-HOLMAN COMPANY Inglewood, Calif. Offices in Principal Western Cities • Branch and Warehouse in San Francisco



For the backbone of your system POLES and CROSSARMS

Via GraybaR

The pole-line backbone that supports today's essential power lines needs seasoned strength and durability to do its job efficiently and at low maintenance cost.

That's one reason why power companies all over the nation choose Graybar for all their pole-line needs. They know that Graybar-distributed materials are always right for the job and stand up under abnormal stress of storms, ice, and snow.

POLES – Differing conditions lead to different local preferences. That's why Graybar distributes *all* types of poles – full-length, pressure-treated Southern Pine . . . full-length, pressure-treated Fir and Cedar . . . butt-treated Northern and Western Cedar.

All treated poles are carefully selected and processed to provide maximum strength and durability – plus the clean, smooth exterior surface required for city use.

CROSSARMS – Douglas fir crossarms via Graybar are selected and seasoned under rigid methods – are strong, long-lasting, and provide a wide margin of safety in the line.

POLE-LINE SUPPLIES – Graybar also distributes insulators, wire, cable, strand, hardware, tools, and hundreds of other needed pole-line supplies – all products of outstanding manufacturers.

To keep the backbone of your system strong, order your supplies from Graybar. You'll always get dependable items, and the nation-wide Graybar warehouse system helps assure the *fastest possible* deliveries under today's uncertain conditions.

Because Graybar is wholly owned by its operating and retired personnel, you can always expect an extra measure of personal interest in serving you. Feel free to call your local Graybar Representative for information on any electrical item . . . call your nearby Graybar Outside Construction Specialist for planning aid and technical advice. *Graybar Electric Company, Inc. Executive Offices: Graybar Building, New York 17, N. Y.*

148-812

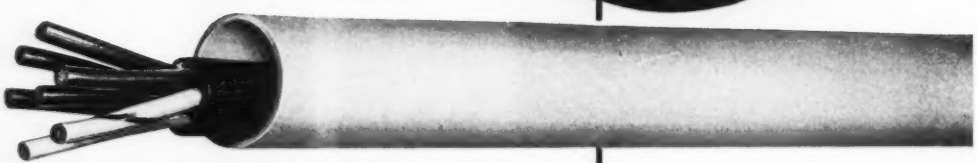
Everything for your pole lines
Via GraybaR

IN OVER 100 PRINCIPAL CITIES

ROCKBESTOS PNR®

HELPS YOU EXTEND YOUR STEEL CONDUIT ALLOTMENT

Ordinary 7-conductor competitive cable, #9 AWG takes 1¼" conduit. 228 Lbs. of steel/100.'



PNR 7-conductor cable #9 AWG takes 1" conduit. 168 Lbs. of steel/100'. *You save 60 lbs.*

Approximately ½ the size of competitive control cable, Rockbestos PNR helps to provide the solution to your critical steel requirements. It enables you to use smaller conduit and fittings, thus providing substantial steel savings; or you can put 12-conductor cable in conduit carrying 6 or 7.

Here's the Rockbestos construction that makes PNR a better control cable... Polyethylene for high dielectric strength — Nylon for toughness and abrasion resistance — Rockhide for high resistance to weather, chemicals and abuse.

Get the PNR story, today. Write or ask your nearest Rockbestos representative.

QUICK FACTS ABOUT PNR

- 46% smaller area* . . . 28% smaller diameters*. Use smaller conduit and fittings or put more conductors in present conduit.
- Dielectric breakdown...over 40 times operating voltage.
- Lighter and smaller. Easier to handle, store, ship, pull through conduit.
- Flexible to —25°C (—13°F). No cracking!
- Rated 600 volts . . . conductor operating temperature 75°C (168°F).

*Average determined by comparison with competitive control cable.

ROCKBESTOS PNR®

...another different, better cable by

ROCKBESTOS PRODUCTS CORPORATION, NEW HAVEN 4, CONN.

the originators of **A.V.C.®**

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BullDog Plan hailed by contractors!

Established 1908

Texas 4-2300

W. D. GALE, INC.

Electrical Contractors

7145 Tireman Avenue
DETROIT 4, MICH.

October 29, 1951

BullDog Electric Products Company
P. O. Box 177
Detroit 32, Michigan

Gentlemen:

Well, someone finally did something about it!

Congratulations, gentlemen, for clearing up the safety switch end of the complex electrical-products field. As one of Detroit's oldest contractors we are already feeling the effects of your simplified Vacu-Break line.

For example, to insure installations on time, we have always had the problems of stocking a heavy, complicated inventory of electrical materials, among them many of the 206 safety switches you formerly catalogued. Now that you have reduced that line to only 38 for all applications, ordering is easier, and we have been able to cut our switch inventory drastically.

A TYPE A SWITCH AT TYPE C PRICES

This, of course, means we can keep our investment down, and save on sorely needed warehouse space, as well.

Furthermore, our customers like your program -- since they receive Type A switches at Type C prices -- improved quality at less cost to them.

Thanks for taking the confusion out of the safety switch line and for initiating a sensible program which should benefit the entire industry.

Very truly yours,

W. D. GALE, INC.

J. A. Schoenith

J. A. Schoenith,
President

From everywhere, contractors are writing enthusiastic letters like this, hailing the new BullDog simplification plan . . . reporting faster installations, added convenience, savings in time and money wherever they work with safety switches.

There's every chance that you, too, will get similar benefits if you order, stock and install the simplified line of BullDog Vacu-Break Master Safety Switches. Write Dept. 453-B for descriptive folder.

BULLDOG

BULLDOG ELECTRIC PRODUCTS COMPANY
DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

THE LEADER IN FLEXIBLE ELECTRICAL DISTRIBUTION

Single Phase Detachable Meters

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Polyphase Switchboard Combination Watthour and Thermal Watt Demand Meter-Flexitest Case

Polyphase Recording Differential KW Demand Meters

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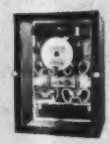
Polyphase Totalizing Recording KVA Demand Meters

Polyphase Indicating KVA Demand Meters

Combination Polyphase and Thermal KVA Demand Meters



Polyphase KVA Demand Impulse Senders

Polyphase Impulse Operated Recording KW Demand Meters

Polyphase Impulse Operated Recording KVA Demand Meters

Single Phase Varhour Meters

Block Interval KW Demand Registers—Indicating and Cumulative

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Portable Standard Watthour Meters

Combination Single Phase and Thermal Watt Demand Meters

Polyphase Recording Demand Meters

Polyphase Switchboard Totalizing Watthour Meter-Flexitest Case

Single Phase Combination Watthour Meter and Time Switch

Impulse Totalizing Relays

There's a Westinghouse meter for every application!

Forecasts of unprecedented load growth in the coming years suggest many changes in metering practices. That's why a *complete* line of metering equipment holds an advantage for you. Specifically . . .

It's assurance that your *future* as well as your present needs can be readily fulfilled.

The wide variety of meters illustrated here is typical of the broad line of Westinghouse Meters offered to you. These and many more types are available to give you low-cost metering for every circuit application . . . three wire, four wire, wye or delta, or totalizing.

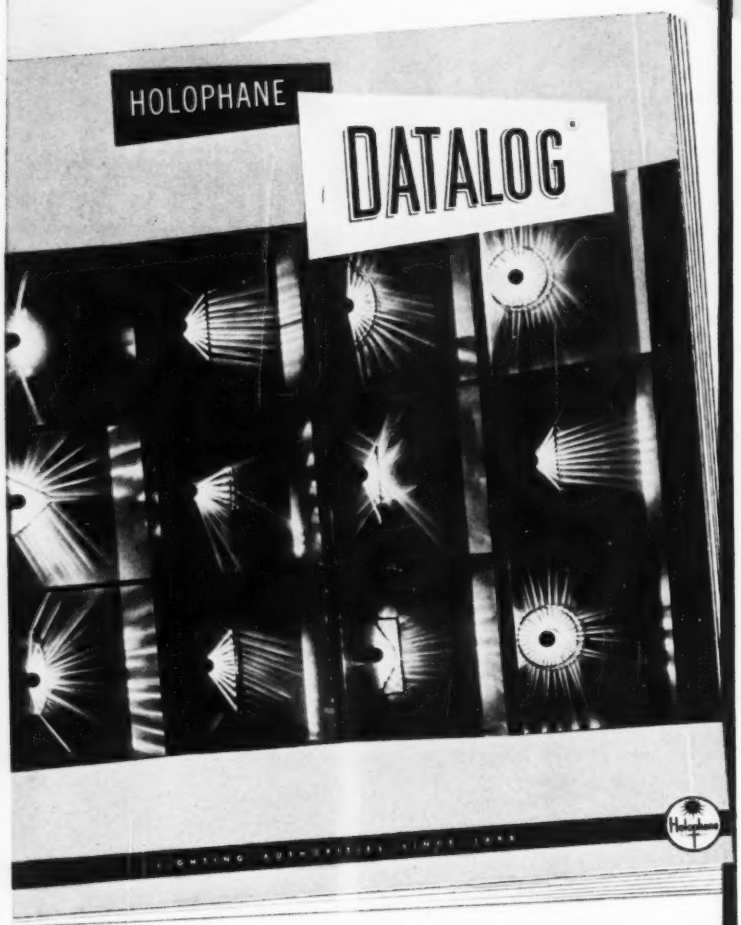
To meet your expanding needs Westinghouse has continually pioneered new devices to make the desirable changes in metering methods a practical reality. And you have assurance of dependability because every Westinghouse Meter contains the quality and refinements that result from the engineering of a complete line. So whether your needs involve metering large loads or small, single or polyphase circuits, kw or kva, Westinghouse can meet your requirements.

For more information write for Booklet B-4665. Call your Westinghouse office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-40408

YOU CAN BE SURE... IF IT'S Westinghouse METERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

YOUR COPY of this Engineering-Data Catalog IS READY NOW!



A Complete GUIDE containing PRODUCT INFORMATION especially compiled for:

Architects
Engineers
Consultants
Draftsmen
Plant Executives
Electrical Contractors
Superintendents
Work Managers
Interior Decorators...
And all other people responsible for installation of proper COMMERCIAL, INSTITUTIONAL, INDUSTRIAL or OUTDOOR LIGHTING.

64 PAGES OF PERTINENT INFORMATION . . . Containing many illustrations of Holophane products . . . cross-sectional drawings . . . candlepower distribution curves . . . detailed information on a total of 270 lighting units . . . Description, performance, application and dimensional data are given on equipment . . . This book introduces the new Prismatic Control Board in the Light and Vision Institute, as well as many other new developments of Holophane research.

Please attach coupon to your firm letterhead.

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Lighting Authorities Since 1898 · 342 MADISON AVENUE, NEW YORK 17, N. Y.
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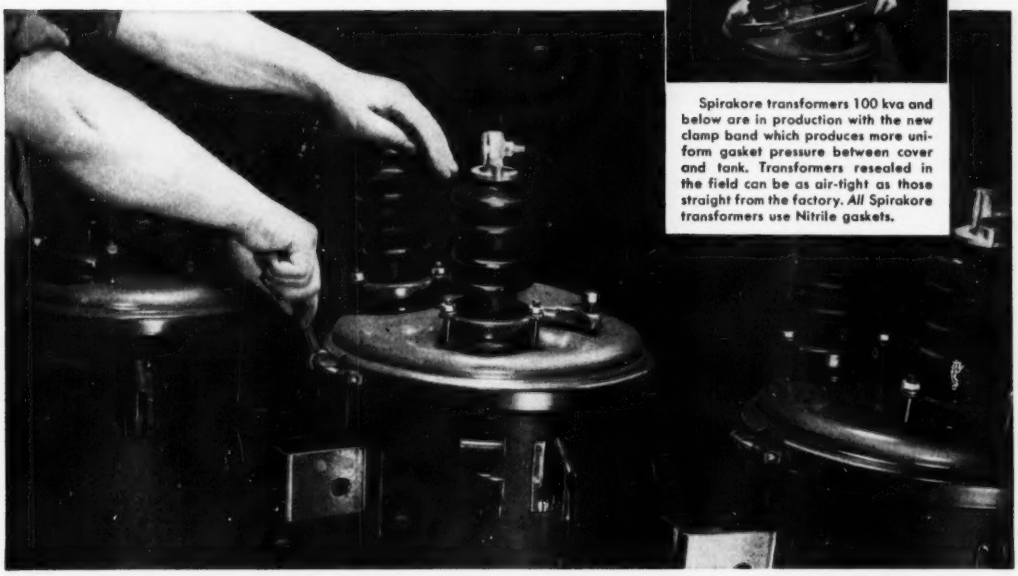
E4

New cover band makes seal on G-E Spirakore* transformers even better



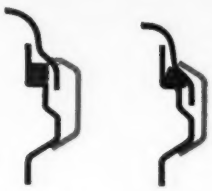
Spirakore transformers 100 kva and below are in production with the new clamp band which produces more uniform gasket pressure between cover and tank. Transformers resealed in the field can be as air-tight as those straight from the factory. *All* Spirakore transformers use Nitrile gaskets.

The cover on General Electric distribution transformers is now clamped against its Nitrile rubber gasket by a clamp band or ring. This produces uniform gasket pressure around the entire cover rim—results in even better sealing and resealing than ever before.

As in the past, breathing is completely stopped in G-E Spirakore transformers. Sealing is air-tight so that moisture-laden air can't be drawn into the tank to contaminate oil and shorten transformer life. Yet with this sealing, the new clamp actually improves accessibility. One bronze bolt holds the cover tightly in place. Loosen it, and band and cover lift right off. No adhesives to break—no surfaces to clean before resealing. You even re-use the same gasket.

Better sealing is only one of the reasons why Spirakore is the finest transformer you can buy. The full story is told in Bulletin GEA-5400. If you haven't a copy, write for one today. Address *General Electric Company, Schenectady 5, New York.*

*Registered trademark of the General Electric Company.



BEFORE TIGHTENING **AFTER TIGHTENING**

The brown represents the Nitrile rubber gasket which is of square cross section. The red is the new clamp band. When the band is tightened, the cover is drawn down against the gasket, compressing it and making an air-tight seal.

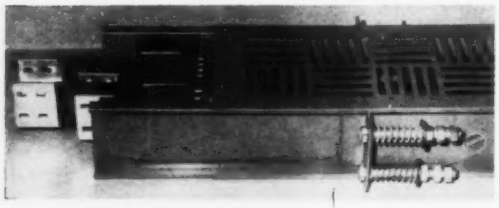
All openings—hand holes and bushings as well as cover—are sealed with Nitrile gaskets which are resistant to oil, age, sunlight and operating temperatures.

402-111

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

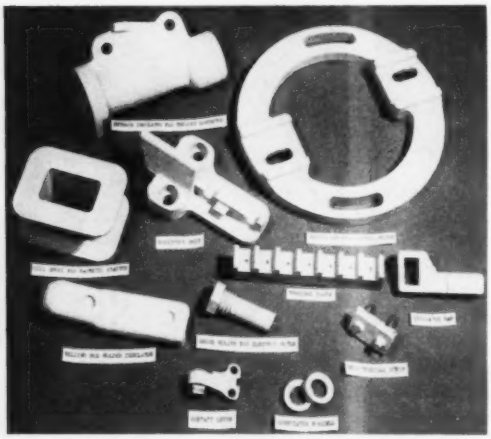
PRODUCT NEWS



Hanger for Vertical Bus Duct

(1) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

A new-type hanger for supporting vertical runs of bus duct is claimed to permit the duct to be spring-mounted so that its weight is uniformly carried by all supports and is distributed equally during expansion. A recent modification permits the supports to be located anywhere along the duct. It requires drilling four holes in the duct housing and bolting the hanger in place.



(2) Typical uses for the new Plaskon reinforced alkyd molding compound, fiber glass-filled resin that can be molded by standard plastic methods at high speeds. It is claimed to have impact strength greater than all other molding compounds, plus high heat resistance, extreme dimensional stability and good electrical properties. It is supplied as a complete molding material and may be straight compression or transfer molded, according to its manufacturer, Libbey-Owens-Ford Glass Co., Plaskon Division, Toledo, Ohio. The new material will be sold in two forms, Plaskon alkyds 440 and 442, the latter claimed to have good flame resistance

For Additional Information
Fill in the Coupon on Page 46

Extra-Thin High-Heat Insulation

(3) Irvington Varnish & Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.

Silicone resin-coated Novabestos, a new extra-thin, high-heat insulation, is .003 in. thick; can be used at operating temperatures of 180°C. It is composed of 97% pure asbestos and 3% organic material. The long fiber construction of this base asbestos sheet also gives it unusual physical properties for such a thin material, the manufacturer states. Technical data and samples are available from the manufacturer.

Connector Body

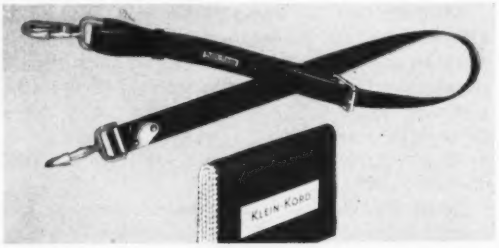
(4) Rodale Mfg. Co. Inc., Emmaus, Pa.

A 10-amp polarized connector body, catalog 2120, features a double T slot accommodating both special T caps and standard parallel-blade caps. It is molded of Bakelite and has an armored base and metal cord clamp, both coated to resist rust and corrosion. It is rated 10 amp, 250 v and 15 amp, 125 v. Cord hole diameter, .156 to .500; OD, 1½ in.

New Paint Resin Fast Drying

(5) General Electric Co., Chemical Division, Pittsfield, Mass.

A new Glyptal alkyd resin is claimed to air dry dust free in five to ten minutes and tack free in three to five hours. The manufacturer recommends it for appliance and furniture finishes, primers, automobile and metal cabinet finishes, venetian blind enamels. Glyptal 7422 is a short, pure, oil-modified alkyd, free of rosin, phenolic, styrene and other modifiers.



(6) A nylon safety strap has been added to the Klein-Kord line of Mathias Klein & Sons, 3200 Belmont Ave., Chicago, Ill. It is claimed that increased flexibility and a smooth surface that gives long service result in a product that wears evenly and does not require dressing or treatment. Straps are made of multiple plies of strong, finely woven Nylon bound together with frictioning and vulcanized in neoprene. The Klein Red Center gives a signal before wear reaches danger point. Available in two standard lengths, 5 ft, 8 in. and 7 ft, with standard snaps or Klein-Lok snaps. Other lengths are manufactured on order

KEARNEY Pioneers Again!

Introducing the

SQUEEZON

the NEW Pure Copper Cold Welder Connector That Eliminates Contact Corrosion

by permanently sealing out air between conductor, connector and tap transfer surfaces with tons of pressure

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

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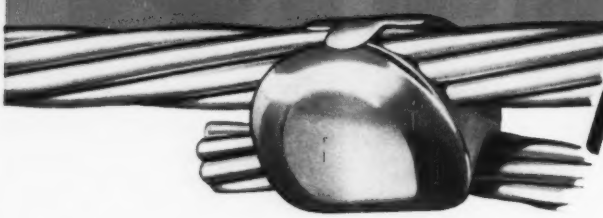
Canadian Plant: Guelph, Ontario

. . . turn the page for more information on the Kearney Squeezon

THE KEARNEY SQUEEZON
a Forward Step in Power Line Connection

The KEARNEY SQUEEZON

Is a Completely New, Advanced Type CONNECTOR That Gives You a Quicker, Better, More Permanent Connection



At 1/2 the Cost!

Why This New Kearney Connector Was Developed

It is an accepted fact that the major causes of connection failure are (1) overheating caused by the increased resistance of contact surface oxidation, and (2) loosening caused by line vibration and change in temperature.

Kearney set out to overcome these problems by developing a compression connector designed for today's increased loads. The Squeezon is the result!

Prevents Oxidation of the Contacting Surfaces

Each conductor slips into a rounded trough or bed in the connector which conforms to the shape of the wire. After tremendous hydraulic pressure is applied, the Squeezon is pressed around the wires so tightly that all air is permanently excluded from between transfer surfaces.

Because corrosion of these critical surfaces cannot occur and because of the pure copper composition of the Squeezon, conductivity is extremely high. Result: the temperature of the connection is kept well below the temperature of the line wire.

Now, for the first time, it is possible to construct an electrical pipe line from generator to user completely fabricated of pure, permanently connected copper.

Every Connection Is Uniformly Tight

Linemen have widely varying ideas of what constitutes a tight connection. The Kearney Squeezon removes the guesswork from line connection — each one is compressed exactly the same amount — the correct amount for perfect contact and prevention of damage to conductors. There are no "bad" connections to fail.

Costs Less to Use — Costs Less to Buy

Connections are extremely easy to make. The tool is light, simple to use and enables the lineman to work quickly. You can buy a hydraulic tool for each service truck out of the first year's savings when you use the SQUEEZON!

Specify KEARNEY PRODUCTS

The Quick, Modern SQUEEZON Way...

A CLICK—and it's Done!

The KEARNEY SQUEEZON is a pure copper compression-type connector forged in a shape having an "H" cross-section. The connection is made by placing one conductor in the top half of the "H" and the other in the bottom. The sides are then coined over under tremendous hydraulic pressure — applied by pumping one handle of the SQUEEZON Tool. When a distinct click is heard the connection is then complete, permanent and a perfect electrical bond.

Write today for the big, 8-page bulletin on the Squeezon.

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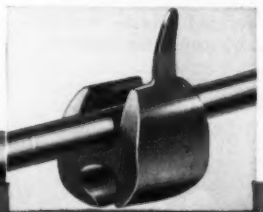
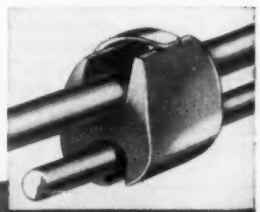
West Coast Distributor: MAYDWELL & HARTZELL





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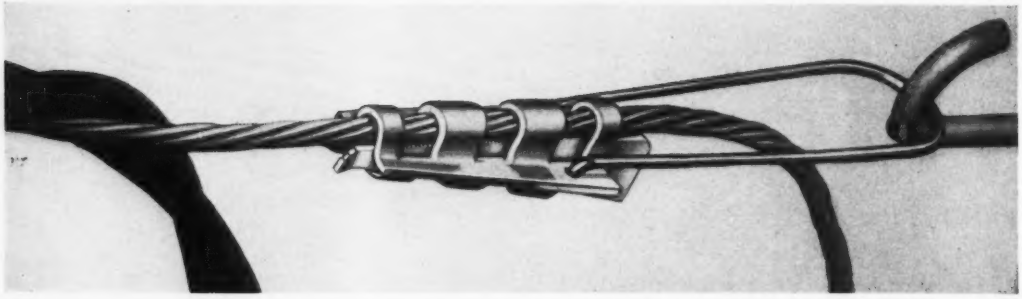
Better Construction — *SAFER* Maintenance



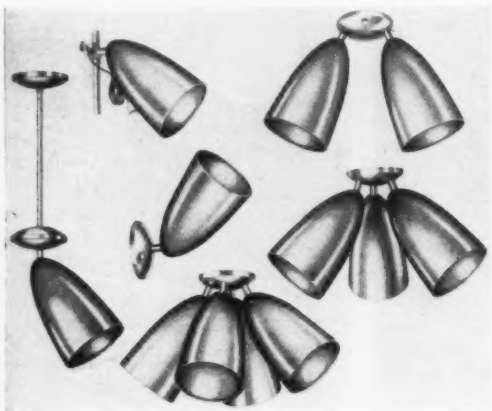
Newly Designed Cable Clamp

(7) James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo.

This new clamp was designed to dead-end the bare neutral type of self-supported secondary and service drop cable at either the pole or service entrance. It is made of high-strength, corrosion-resistant materials and is plated for use with all types of neutral wire; will accommodate wire sizes 6 solid through 4 stranded. A self-contained, serrated wedge in the clamp grips the bare wire with a force proportional to the strain put upon it. This strain is not transmitted to the insulated conductors.

To install, the end of the neutral is threaded through the clamp and the wedge is moved against the wire when the desired sag has been obtained. The bail is then dropped over a standard house or pole hook, and the wires are ready for connection. Readjustment of the sag is easily accomplished, if necessary, according to the manufacturer.

The clamp is made as a single unit and the wedge or bail cannot become separated from the clamp body, it is stated.



Adjustable Flood Lights

(8) Revere Electric Mfg. Co., 6009 Broadway, Chicago 40, Ill.

The Show-Master unit is designed to accent displays by flood or spotlight. It is available for wall, suspended or flush-ceiling mounting, for portable use and in clamp-on type. The units are adjustable and will remain fixed at any angle. No nuts, set screws or springs are required, it is claimed.

These lights come in 6-, 12-, 24-, 48- and 60-in. stem lengths for coupling to existing short-stem units. All are designed for the R-40 or PAR 38 lamps and use of 150-w lamps is recommended by the manufacturer.

For Additional Information Fill in the Coupon on Page 46

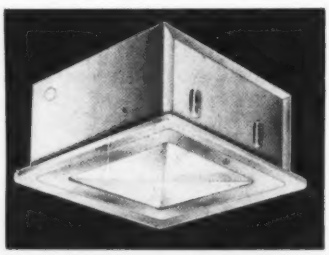
Heating Cable

(9) Edwin L. Wiegand Co., 7540 Thomas Blvd., Pittsburgh 8, Pa.

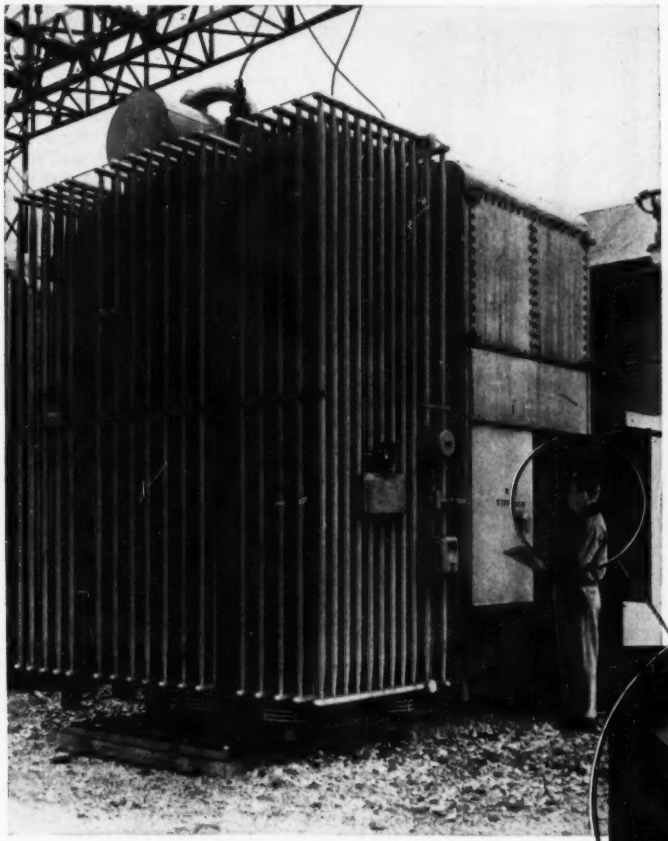
A flexible electric heating cable, Thermwire, consists of a heavy-gage nickel-chromium resistor wire with abrasion-resistant insulating sheath; is for the industrial and consumer fields. It is claimed to protect roofs, gutters and downspouts from accumulations of snow and ice; when embedded in asphalt or concrete, to melt ice from doorways, steps, sidewalks, driveways or other pavements; to prevent freezing of pipes; to heat soil. It is available through electrical dealers and distributors; comes in two packaged sets, one 80 ft long, 400 w, 115 v; the other 160 ft, 800 w, 230 v. Each has a 10-ft cold lead section and plug. Thermostatic control is optional.

Recessed Lighting Units

(10) Day-Brite Lighting Inc., St. Louis 7, Mo.

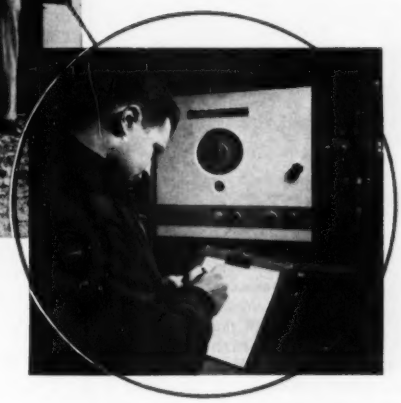


Duo-Frame lighting units come in two styles, one for 8½-in. and the other for 12-in. Holophane Controlens. The units are die-formed and reinforced; have no sharp corners or raw edges. The inner frame only is opened for relamping and concealed drop hinges give a smooth appearance. The Controlens is securely positioned to avoid its falling out. Mounting slots allow for variation in ceiling construction. Plenty of knockouts are provided, the manufacturer states.



General Electric transformer rated 6000/7500 kva, 33-kv, installed on Indianapolis Power & Light System. Load-ratio control in low-voltage winding provides ±5% voltage regulation.

Prediction: 14 years of tap changes without any servicing



This particular G-E transformer will operate 14 years at its current rate of 20 tap changes a day before its load-ratio-control equipment requires servicing. This means that for 14 years the maintenance crew will not have to clean insulating surfaces or filter the contactor oil! In fact, the contactor compartment need not be opened during this entire period.

The really significant point, however, is this: We can tell you—and do tell you for each transformer—how many operations the LRC equipment will make before any servicing is required. We have tested the contacts of each design until we know, accurately, the life of the arcing tips. By the use of electrostatic shielding, and by having a major portion of creepage distances in the vertical plane, we prevent dangerous deposits of carbon from forming on insulating surfaces during this period.

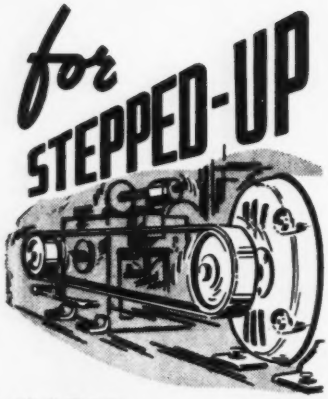
In other words, with G-E load-ratio-control equipment, you don't do any *unnecessary* service work. You simply refer to the instruction book and read the counter to predict the time that servicing is actually required.

Over 37,000,000 installed kva have proved that General Electric LRC is as reliable as the core and coils themselves. Call on your G-E representative for a complete discussion on the LRC transformer best suited to your application. *General Electric Co., Schenectady 5, N. Y.*

401-18

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.



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What makes the performance of motors and generators better? The answer is very simple—merely equip them with the proper OHIO brushes and watch them "Go to work!" In order to pick the proper brush for the proper application, we have compiled complete catalogs on the following various subjects:—Industrial, General Purpose, Mining, Welding, Appliances.

Here at "OHIO" we welcome your inquiries and specifications for unusual and specially designed carbon specialties.

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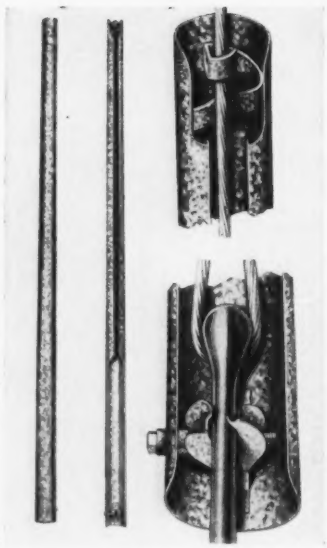


Guy Wire Protector

(11) Line Material Co., Milwaukee 1, Wis.

This new guy wire protector is made of galvanized No. 18 gage steel; is tapered, tubular and fully rounded with smooth rolled edges. It has a 30-in. "cutaway" opening at the bottom to permit installation over an anchor rod and two 6-in. guy clamps in series. There are no loose parts to fall out, the manufacturer states. The protector comes in 7- and 8-ft lengths, the latter size REA approved.

Installation is by means of a base clamp that is tightened from the side with one bolt. This clamp is claimed to have tremendous holding power over a range of diameters from ¼-in. guy strand to 1-in. anchor rods. The protector will not twist after this clamp has been tightened, the manufacturer reports. Attachment at the top of the protector is made by means of a hook to guy strand of any diameter from ¼ to ½ in. It is claimed that this hook holds the strand so tightly there is little possibility of rattling.

(12) **TIMER**—An electronic timer using a type 5823 cold-cathode trigger tube is not energized during standby periods; is claimed to give instant and accurate timing without warm-up. This model CK timer is made by Farmer Electric Co., 21 Mossfield Road, Waban 68, Mass.

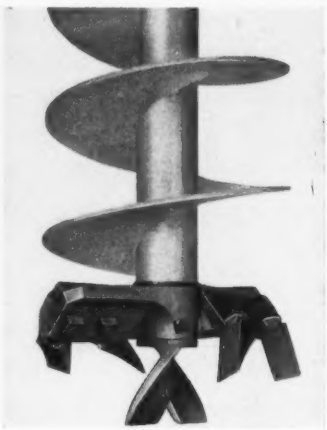
(13) **WELDER**—A. O. Smith Corp., Milwaukee, Wis., has a new heavy-duty d-c welding machine for industrial uses. It is available in 200-, 300- and 400-amp ratings.

Step-Motor Impulse Counter

(14) General Electric Co., Schenectady 5, N. Y.

An impulse counter designed to give 100% accuracy up to 60 counts per second consists of a step motor with a resetting-type register and a power supply enclosed in a steel case. Covering counting ranges above those possible with electromechanical counters and below those in which scalers are normally required, the device is said to be especially useful in high-speed production counting and to be applicable to certain types of radiation counting where use of a direct-reading register is desirable.

The counting assembly can be removed and placed in a remote position. Over-all dimensions are 13x11x 7 in.; weight, approximately 12 lb. Device operates on 115 v, 60 cycles. Details in publication GEC-829.



Cutting Head for Earth Drill

(15) Petersen Engineering Co., Santa Clara, Calif.

This new Pengo cutting head for welding to any continuous helix-type earth drill or post hole auger is of twin-helix design. It is said to work favorably under any ground conditions, but its main feature is claimed to be that it bores holes under adverse conditions with machines using the continuous helix auger, where formerly heavier-type machines were required.

The cutting teeth are arranged in the same staggered pattern as is used on the regular-duty twin-helix Pengo earth auger. The heads are available in eight sizes ranging from 10 to 24 in. in diameter.

VICTOR No. 26-R PINTYPE

Distribution's Biggest Value!

- SPECIALLY DESIGNED for medium voltage lines up to 25 KV.
- MODERN, PRACTICAL DESIGN enables us to make production economies and thus offer this insulator to you for less than other pintypes available for use up to this voltage.
- HAS RATED 60 CYCLE DRY FLASHOVER OF 95 KV., wet flashover of 60 KV., voltage rating of 27 KV. and leakage distance of 15 inches.
- CONDUCTOR GROOVE is specially designed to facilitate hot-line work.
- SELF-CLEANING DESIGN and long leakage distance cut replacements and maintenance costs in contaminated areas.
- SERVICE TESTED RADIO-FREE GLAZE gives a maximum RNI of 100 MV. at 15 KV., cutting interference to a minimum for the life of the insulator.

VICTOR NO. 26-R MEDIUM VOLTAGE PINTYPE. For complete engineering data on this insulator and on other sizes and types, write today for Bulletin No. 4.

Do You Know that...

VICTOR was the first manufacturer of wet process porcelain to utilize American clays exclusively. Its raw materials come from Georgia, Florida, Pennsylvania, Virginia, Kentucky, Tennessee, New Hampshire, Missouri and Ontario, Canada.

This rugged, medium voltage pintype has really made a hit with power men since its introduction last year. There are many reasons why. Its original cost is low, yet it permits higher insulation levels on present lines and provides for future voltage increases on proposed lower voltage lines.

Made to order for contaminated areas, too. Like all VICTOR insulators, they are made of highest quality *wet process porcelain.* Each is individually inspected at every point of manufacture and electrically tested before shipment.

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Specify VICTOR PINTYPE INSULATORS

How many times have you looked for a Flood like this?
Revere
PAR-46 & 56 LAMP HOLDERS

Provides all the advantages of sealed beam lamps and fits a multitude of applications, where long throws from high ceilings, and outdoor uses, where a narrow beam is needed. Write today for catalog information.

Typical applications: Floodlighting water tanks, smoke stacks, monuments, fence lines, narrow passageways, flags, archery and rifle shooting targets, bowling pins, railroad yards, safety islands, traffic signals, etc.

WHITE-WAY PYLON-LITES
To brighten Boulevards and Business Centers

AREA and CLUSTER LIGHTS

Full Line of LUMINAIRES for Incandescent and Mercury Lamps

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6016 BROADWAY • CHICAGO 40, ILL.
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Voltage Regulator More Compact

(16) Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee 1, Wis.

A more compact design of the Rocking Contact voltage regulator for small a-c generators is available in two ratings: one with a 34-step commutator (type V-00) and the other with 50 steps (type 221). The former has a maximum rating of 157 kva at 3,600 rpm and the latter a maximum of 438 kva at 3,600 rpm.

Over-all size has been reduced so that the regulator takes less switchboard space. Meterlike in appearance, it is semiflush mounted to match switchboard instruments. It has a built-in voltage adjusting rheostat. All moving parts are totally enclosed.

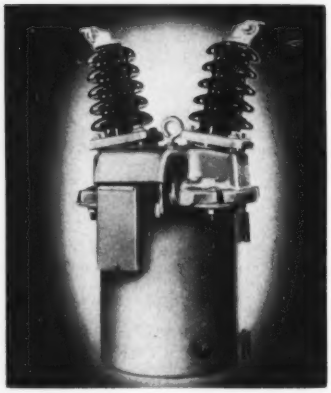
The Rocking Contact design is claimed to do away with vibrating or sliding contacts. It is in motion only when change in excitation is required. An elastically coupled damping system prevents hunting. The regulators are described in bulletin 14B6143A.

Earth Anchor

(17) Pieper-Lillard Inc., St. Louis 22, Mo.

Designed for power transmission and heavy distribution lines, this 4-way anchor is 10 in. in diameter and has a projected area of 200 sq in. expanded with nominal holding power classification of 20,000 lb. It is claimed to have all the features of present 2- and 4-way anchors; to be easy to install with a few blows of the spreading tool.

(18) **WIRE CLAMP**—Tinnerman Products Inc., Box 6688, Dept. 14, Cleveland 1, Ohio, makes a wire harness clamp to secure bundles of wire in aircraft, or mobile units. The clamp, which can be opened and closed without tools, is built with an interlocking slot and tongue so that it cannot be opened accidently, the manufacturer reports. It is made for single or tandem use and holds bundles 5/16 to 1¼ in. in diameter.



Oil Switch

(19) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

Type CSO-1 single-pole oil switch is primarily for control of small banks of pole-mounted capacitors and is claimed to be well suited for sports field, street and airport lighting and as a load break sectionalizing switch on rural and suburban distribution systems. It can be operated manually or electrically by an automatic control device. Operating coils are interchangeable and give 110-, 220- and 440-v control. Single-pole switches can be ganged mechanically or electrically for 3-pole switching duty.

The switch has a life of 2,500 to 10,000 operations, depending on the current switched. It has a momentary rating of 6,500 amp rms asymmetrical; is designed for 15 kv and a thermal rating of 200 amp. Current rating will vary with type of load.

(20) **BRACKET**—An aluminum bracket to hold switch box to plasterboard, plywood and other materials where screws or nails are impractical consists of a small angle piece 2x⅜x3/16 in. from which extends a 1⅛x1 in. triangular lip. A prong extending at right angles from the lip gives the bracket its gripping contact. The device is made by Hilco Engineering Co., Genoa City, Wis.

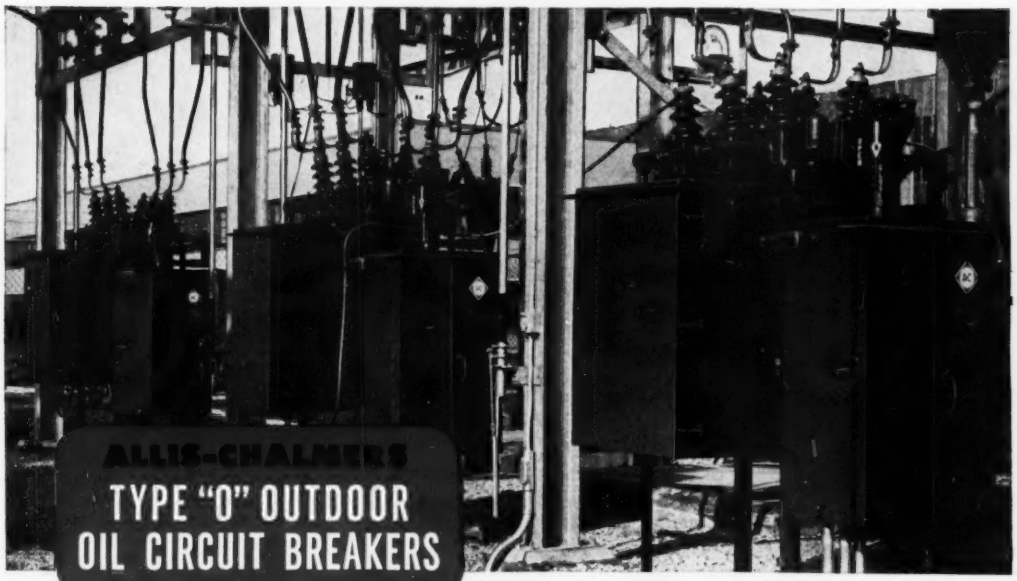
(21) **BENDER**—A bending die that adapts its No. 2 Universal iron bender to thin-wall electrical metal conduit has been announced by Hossfeld Mfg. Co., Winona, Minn. The bender handles all standard sizes of thin-wall conduit from ½ to 2 in. Full 90° bends in conduits of 1¼ in. or smaller are made by direct leverage with one sweep of the hand lever, the manufacturer states.

(22) **SEALING COMPOUNDS**—H. V. Hardman Co. Inc., 571 Cortlandt St., Belleville, N. J., has a new line of sealing compounds designed for use where high electrical insulation and low moisture transmission are required.

Dependable

ELECTRICAL PROTECTION

FOR DISTRIBUTION SYSTEMS



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ALL YOU NEED to order your type "O" breaker is one set of specifications. It's simple and convenient. This standard 3-pole breaker comes to you mounted on a strong lightweight framework with operating mechanism and automatic reclosing equipment each in its own weatherproof housing. The type "O" breaker is factory assembled, wired and tested in accordance with ASA standards . . . ready to install and operate.

SECURE THESE PROVEN ADVANTAGES

1 **Positive, high speed breaker action with mechanically and electrically trip-free solenoid operating mechanism, ac or dc operation as specified.**

2 **Efficient circuit interruption with high rate of dielectric recovery for low contact and oil deterioration.**

3 **Automatic reclosing duty for unattended stations with standard protective and reclosing relay equipment included.**

Feature for feature you cannot buy better breakers in this class. Over 50 years of Allis-Chalmers progress in power circuit breakers is built into them. You can install them with complete confidence. For more information call your local A-C sales office or write Allis-Chalmers, Milwaukee 1, Wisconsin, for bulletins 71B6165A (OX-18) or 71B6093C (OZ-110, OZ-210).

A-3440

Type	Rated KV	Rated Amps. (60 cycle)	Interrupting Capacity KVA
OX-18	7.2	600	50,000
OZ-110	14.4	600	100,000
OZ-210	14.4	600	250,000
OZ-210	14.4	1200	250,000
OZ-210	23	600	250,000

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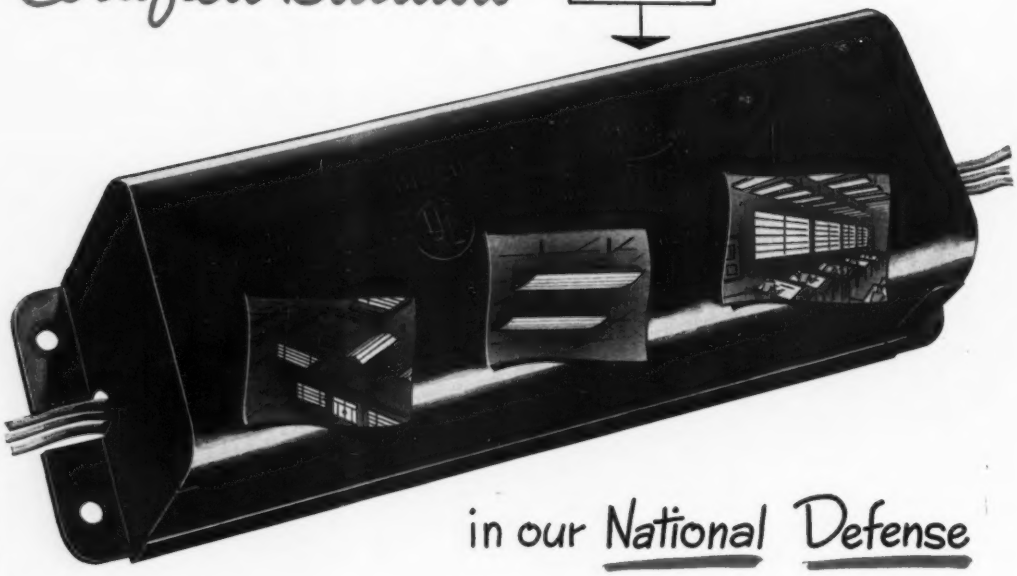
the Role of *Certified Ballasts*

CERTIFIED E·T·L HIGH PF



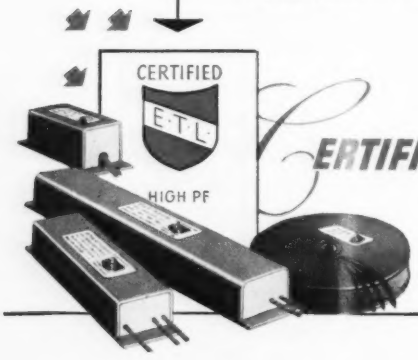
in our National Defense

The making of fluorescent ballasts uses critical materials required in our national defense program.

The Lighting Industry can best conserve available materials by using them most efficiently. To assure *long, trouble-free ballast operation, full lamp life, rated light output and satisfactory fluorescent performance,* insist on CERTIFIED BALLASTS in all fixtures.

CERTIFIED BALLASTS are tested by Electrical Testing Laboratories, Inc., which certifies they meet the precise specifications that assure efficient operation.

TO BE SURE . . . look for the CERTIFIED shield on the ballast.



Participation in the CERTIFIED BALLAST program is open to any manufacturer who complies with the requirements of CERTIFIED BALLAST MANUFACTURERS.

CERTIFIED BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting

2116 KEITH BLDG., CLEVELAND 15, OHIO

Luminaire

(23) Line Material Co., Milwaukee 1, Wis.

Designed primarily for the complete range of mercury vapor lamps in the horizontal burning position, this Ovalite luminaire also will take incandescent lamps up to and including 800 w on multiple circuits and 15,000 lumens on series circuits.

Low surface brightness is secured by locating the light center approximately 3 in. above the bottom edge of the reflector element and by using elevating prisms in the enclosing refractor. By this means the light on the large glass area becomes evenly distributed so as to reduce glare and increase visibility.

The rectangular-shaped Alzak reflector gives an asymmetric light distribution, with high utilization efficiency on roads and sidewalk areas, the manufacturer states. Prisms on the refractor house side redirect the light toward the street area.

The unit is offered for slipfitter and pendent mounting in 1¼- or 2-in. sizes; will accommodate the AH-5, 11,000-lumen, AH-1, 15,000-lumen or the EH-1, 20,000-lumen mercury vapor lamps in a horizontal position. Magnetic arc control is required when operating the AH-1 lamps and is available as optional equipment for improved efficiency with the EH-1 lamp.

Industrial Unit

(24) Keystone Electric Mfg. Co., 2228 E. Tioga St., Philadelphia 34, Pa.

This new RLM industrial fixture comes in two and three light 40-w fluorescent units with standard or turret sockets. A unit for two 85-w F lamps is available also, as are slimline fixtures for two 48 T-12 and two 96 T-12 lamps, using ballasts for 430-ma operation.

For more data fill in coupon on page 46

F Luminaire

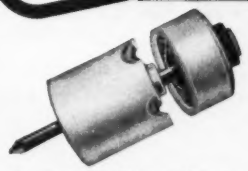
(25) Pittsburgh Reflector Co., 406 Oliver Bldg., Pittsburgh 22, Pa.

The Norwin is an all-white, 2-lamp fluorescent unit claimed to have an 82% over-all efficiency. It is 48⅛ in. long, 17 in. wide, 5 in. deep and uses two T-12 40-w lamps; may be surface or pendant mounted individually or in continuous rows. The eggcrate louver hinges from either side; shielding is 25° crosswise and 35° lengthwise.

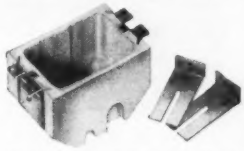
(26) This Slimline spotlight, Model 363, gives down-punch light for merchandise and displays. It mounts in line with open-type or louvered shielded Slimline models; uses the PAR-38 projector spot for flood. It is made by Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago, Ill. Accessory decorative end pieces, Model 038, are available

(27) CABLE — This multiconductor control cable is designed around an open-weave Neoprene-treated Fiberglas cloth; is claimed to have improved resistance to crush, deformation and moisture damage. The Fiberglas cloth is slit into shape and wrapped around the conductors as they are stranded. General Electric Co., Bridgeport, Conn., makes the cable; Owens-Corning Fiberglas Corp., Toledo, Ohio, the cloth

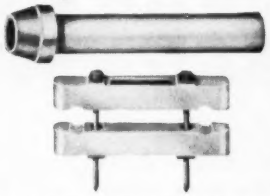
...and for LOW VOLTAGE TOO! call Porcelain Products



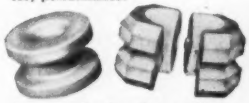
Dense, good looking, positive gripping ALLIGATOR Nail Knobs are preferred by electricians insisting on workman-like installations to build good-will and repeat business.



Outlet boxes with Adjustable Metal Mounting lugs and set of Hangers are nationally famous for durability, ease of installation and safety features.



A complete size range of tubes as well as 2 and 3 wire cleats are available for immediate delivery. Made precisely to give long and satisfactory performance.



Both round and oval type split forestry insulators as well as telephone insulators are available for immediate delivery.

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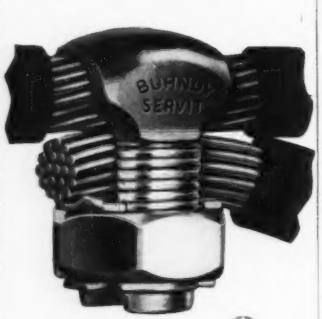

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BULLETINS ETC.

(28) INSULATORS—Data on switch and bus insulators are given in bulletin 5 prepared by Victor Insulators Inc., Victor, N. Y. The new bulletin gives engineering specifications, cross-section and contour drawings, dimensions and stacking data, as well as information on clevis-type and tongue-type straight-line dead end clamps for use on switchyard and bus installations.

(29) CONDUIT — Sealtite, flexible liquid-tight electrical wiring conduit, an Anaconda product, is described in a folder from American Metal Hose Branch, the American Brass Co., Waterbury 20, Conn.

(30) MOTORS—Advantages and limitations of totally enclosed motors with air-to-water heat exchangers are told in a recent bulletin, 05B7682, from Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis. Included is a description of the three types of cooler arrangement (foundation, side or top mounting) built into the motors.

(31) INDUCTION HEATING—Case histories of increased production with induction heating are told in bulletin B-4782 from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

(32) WIRING DEVICES — An illustrated 1952 catalog has been issued by the Rodale Mfg. Co., Emmaus, Pa. The 40-page publication lists more than 1,000 electrical wiring devices.

(33) STREET LIGHTING POLES — A 20-page catalog of aluminum poles for street and highway lighting has been announced by the Union Metal Mfg. Co., Canton 5, Ohio. Engineering tables cover both fluted and plain round designs, various bracket styles with spreads ranging from 4 to 15 ft and mounting heights from 19 to 37 ft. Poles are furnished with or without transformer bases. The new catalog 80 is titled, "Monotube Street Lighting Poles of Aluminum."

(34) HEATERS—Emerson Electric Mfg. Co., St. Louis 21, Mo., lists its combination radiant and fan-type and wide-angle radiant heaters in bulletin X6930.

(35) SWITCHES—Bulletin DC51 from G & W Electric Specialty Co., 7780 Dante Ave., Chicago 19, Ill., covers that manufacturer's type PK load break oil switches. These 5,000-v single-throw switches are rated 200, 400 and 600 amp; have ball and groove high-pressure contacts. Several styles are listed.

(36) INSTRUMENT PANELS — Cabinet-type instrument panels are listed in bulletin P1-2 from Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.

(37) LIGHTNING ARRESTERS—Catalog information on Thorex valve-type lightning arresters is contained in publication 1217-H from Ohio Brass Co., Mansfield, Ohio. Listings supersede those in 869-H.

(38) INSULATION PRODUCTS—Macallen built-up mica electrical insulation products are covered in a 20-page bulletin prepared by Insulation Manufacturers Corp., 565 W. Washington Blvd., Chicago 6, Ill. Built-up mica is used to insulate coils, commutators, armature slots, heating elements and other electrical and electronic units. It is made in a variety of forms by using a bonding substance to put together very thin natural mica splittings or films.

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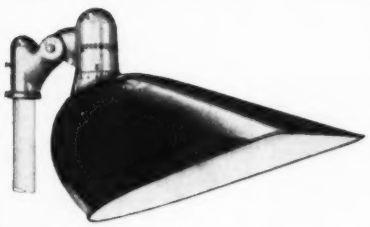

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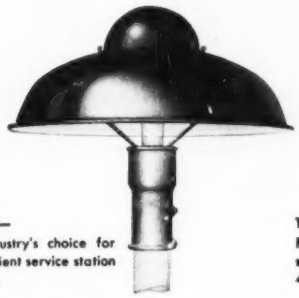
For even illumination of service stations, athletic fields, parking lots, etc. Pole, Bracket or Crossarm mounting.

In these days of accelerated production, good light for outdoor working areas and grounds is a vital *must* for both personnel safety and plant protection. Outdoor lighting planned with Appleton Equipment is your assurance of top-notch illuminating efficiency at minimum installation, service and operating expense. Appleton Lighting Fixtures are available in the exact type and size for every industrial requirement—including hazardous locations—whether indoors or out. For the finest in illuminating fixtures specify Appleton—pace-setting manufacturer of electrical equipment for more than half a century.



STANDLITE—
The oil industry's choice for sturdy, efficient service station illumination.

THE EFU—
First and still finest fluorescent explosion-proof lighting fixture. Available for two 40 watt 48" lamps or two 100 watt 60" lamps.

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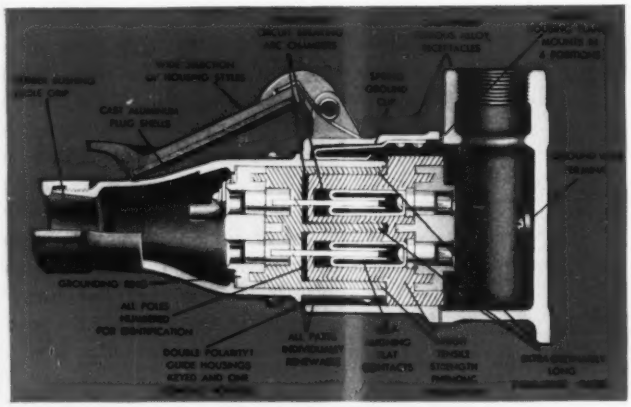
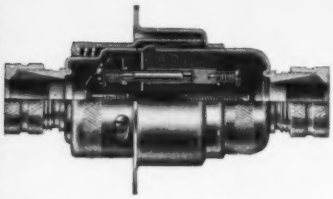
Pyle-National plugs and receptacles are built to withstand the most severe operating conditions, as proven by years of remarkably dependable service in a wide variety of industrial applications. The many substantial construction features of this extensive line of plugs and receptacles and the high quality of materials and workmanship insure safe operation, uninterrupted service and long life.



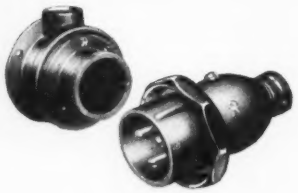
QuelArc* • *Circuit Breaking Series* **Unique partitioned insulation provides long insulated paths through air and across surfaces for exceptional protection in these current rupturing devices. Cast metal housings, high grade insulation and individually renewable contacts insure long service life. Ratings 20, 30, 60, 100 and 200 amperes, 250 volts DC, 600 volts AC—2, 3, and 4 pole—grounded through shell or extra pole. Threaded cap, plain and hinged spring door housing styles are available.**



Interchangeable reversible contact units. 1, 2, 3, 4, 6, 8 pole

Triploc* *and Multiple-Circuit Series* **A line of exceptional versatility, unequalled in the heavy duty field, with a virtually unlimited number of assembly combinations for varied applications. Offers a selection of 1, 2, 3, 4, 6 and 8 pole contact units which are interchangeable and reversible in any single set of housings. Many types of housings available of pressed steel with automatic lock and of cast metal threaded for watertight gasket seal. Multi-Circuit housings with 2, 3 and 4 contact units available for combinations up to 32 poles. Ratings 15 and 20 amperes, 250 volts DC, 460 volts AC—circuit breaking. Pressed steel fusible and fuseless plugs measure only 1 13/16" outside diameter.**

Midget Triploc* *Series* **Same construction features as Triploc except for much smaller outside diameter of plug shell—only 1¼". Interchangeable and reversible contact units—2, 3 and 4 pole—are of the flat blade type. Rated 10 amperes, 250 volts; 15 amperes, 125 volts.**



General Purpose *Series* **Available with cast metal housings in many types for circuit breaking and disconnect service. 30 amperes, 125 volts DC, 250 volt AC—1, 2, 3, 4, 5 and 6 pole. 60 amperes, 250 and 600 volts—3, 4 and 5 pole. 100 ampere, 250 and 600 volts—2, 3 and 4 pole. Also many special types, fusible and fuseless, for varied applications.**

*TRADEMARK REG. U. S. PAT. OFF.

THE PYLE-NATIONAL COMPANY

1364 NORTH KOSTNER AVENUE, CHICAGO 51, ILLINOIS

BRANCH OFFICES AND AGENTS in principal cities of the United States and Canada. • EXPORT DEPARTMENT: International Rail Supply Co., 30 Church St., New York. • CANADIAN AGENT: The Holden Co., Ltd., Montreal

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IT WILL PAY YOU TO KNOW THE ANSWERS TO THESE ELECTRICAL WIRING MATERIALS PROBLEMS

1. Q. WHAT IS THE TWO-WAY PROTECTION OF "G-E WHITE"?

A. The hot-dipped galvanized finish on the inside and outside walls of G-E White rigid steel conduit is the first step towards long-lasting protection. But that's not all... both the inside and outside walls are further protected by a baked-on Glyptal* lacquer finish. The glass-like surface of this coating offers extra protection against corrosion... and makes it easy to pull wires through the conduit.

2. Q. WHY ARE MORE AND MORE ELECTRICAL CONTRACTORS AND MERCHANT BUILDERS INSTALLING G-E MERCURY SWITCHES?

A. Because home buyers, home builders, and tenants in commercial buildings are aware of and asking for the modern touch of the G-E silent mercury switch. Maintenance men prefer G-E mercury switches because they know that fewer moving parts mean longer switch-life and fewer service calls.

3. Q. WHAT IS AN EASY WAY TO SAVE TIME AND MATERIALS IN POWER CABLE INSTALLATIONS?

A. Use a flexible, ready-to-install cable that has a thoroughly impregnated varnished-cambric insulation and a sheathing of light-weight steel or bronze armor. Such a cable can be quickly run around obstructions, looped over beams, or hung up on racks... is suitable for permanent or temporary installations... can be easily taken down and used again in new locations. When you use G-E interlocked armor cable, insulated with long-lived G-E No. 1799 varnished-cambric cloth, you have a cable that meets all of these requirements.

4. Q. HOW CAN PROVISION BE MADE FOR LATER EXPANSION OF ELECTRIC WIRING IN COMMERCIAL BUILDINGS?

A. When a new building is being planned, make sure that the advantages of using G-E Q-Floor wiring are considered. This underfloor wiring system makes possible the installation of an outlet in any six-inch area of the floor surface... makes electrical facilities easily available when either office rearrangement or relocation of office partitions is necessary due to changing tenant requirements or when expanded facilities are needed. Even though construction may be held up today, it's not too early to get all the facts about G-E Q-Floor wiring.

HERE'S HOW TO GET COMPLETE INFORMATION ON G-E WIRING MATERIALS

Your G-E Construction Materials distributor can supply you with the latest information on wiring materials. Because he offers a comprehensive line of G-E wiring materials, he can help you with your wiring problems. Call on your G-E Construction Materials distributor for the wiring materials you need. There's a G-E Construction Materials distributor in every major market area ready to serve you. And remember also, for special engineering problems, communicate with either the Construction Materials district office in your area or the G-E Construction Materials Division at Bridgeport.

*Registered Trade-mark of General Electric Company

Section K69-1225, Construction Materials Division
General Electric Company, Bridgeport 2, Conn.

Please send me the free information which I have checked:

- ☐ Rigid Conduit Folder
- ☐ G-E Mercury Switch Folder
- ☐ Interlocked Armor Cable Booklet
- ☐ Q-Floor Wiring Data Manual

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

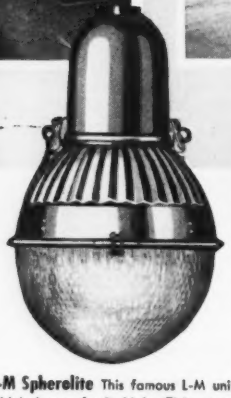
You can put your confidence in—

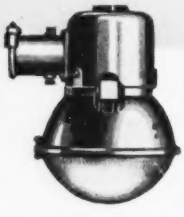
GENERAL ELECTRIC

For every part of town...

L-M LUMINAIRES

make cities brighter, safer

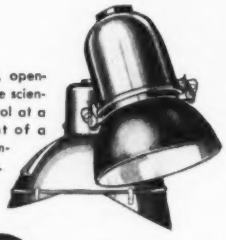




L-M Ovalite—Mercury Vapor Unit. Newly developed optical system assures effective light utilization and good distribution on the street. Mercury vapor lamp is in horizontal position, high up in the reflector to minimize glare. Takes 11,000, 15,000 or 20,000 lumen lamp. Optional magnetic arc control feature keeps arc centered.

L-M Spherolite This famous L-M unit is widely known for its high efficiency, versatility, and many other desirable features. Takes up to 20,000 lumen mercury vapor or 10,000 lumen incandescent lamps.

L-M Spherolite Jr. For better neighborhood lighting at an economical neighborhood price. Interchangeable with Spherolite metal or porcelain heads, permitting low cost installation of the Junior and economical replacement later with the larger luminaire if traffic growth warrants. Has many of the Spherolite features, offers many light distribution patterns.



L-M Directolites Efficient, open-type luminaires that provide scientifically designed light control at a cost little more than that of a radial bowl. Available in symmetric or asymmetric types.

● L-M provides complete street lighting equipment for all sizes of communities and all kinds of neighborhoods. There are incandescent or mercury vapor units for white way lighting. There are smaller units for residential and outlying sections. A wide variety of reflectors, deflectors and glassware provides complete control for every recommended IES light distribution pattern.

Also available are standards, brackets and mast arms, transformers, control and service equipment.

L-M street lighting engineers have years of experience and L-M's engineering service can provide the answer to your street lighting application problem.

WHICH OF THESE BULLETINS DO YOU WANT?

- ☐ Spherolite
- ☐ Spherolite Jr.
- ☐ Street Lighting Standards
- ☐ Directolite
- ☐ Controlite®
- ☐ Brackets, Mast Arms, Accessories
- ☐ Mercury Vapor Lighting Units
- ☐ Control Equipment
- ☐ Protective Lighting for industrial plants

Ask the L-M Field Engineer for the information you want, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

65

Ovalite, Spherolite, and Directolite are trademarks

LM

LINE MATERIAL

Street Lighting

How to make a good connection with L-M connectors

One of the best ways to make permanent, low-resistance connections is to select the best connector for the job. There are many connectors on the market; L-M offers a complete line, including some types not otherwise available. This page shows just a few. But for complete information, get in touch with the L-M Field Engineer, who can work with you on connector and splice problems. Call the nearest L-M Field Office. Or write for copy of our connector bulletin SC1. Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

L-M KYLE Split Bolt Connectors

Heavy-bodied Kyle connectors are machined from heavy stock. They have clean, accurately machined threads, smoothly rounded edges, close-fitting pad. The nut tightens easily, and the pad slides up smoothly to grip the wire solidly. There's little chance for distortion of these solid connectors, and they'll stand re-use—which makes them economical. For all wire sizes from No. 10 solid to a million circular mils. Available for copper, copperweld, aluminum, or galvanized iron wire. In several types, to assure minimum corrosion.

L-M Fargo Automatic Line Splice

Here is a very fast, easy-to-use splice that just won't slip. In pull tests, the wire breaks before it slips out of the splice. You just stick the ends of the wire into the ends of the splice, give it a tug to set the clamps—and the job is done. No tools needed! Wire readily released so splice can be re-used. Widely used for permanent splices; superlative for emergency work. For solid or stranded copper or copperweld; *not suitable for galvanized iron;* for sizes from No. 8 to 500 MCM stranded.

L-M Fargo Vise Type Connector

Left: An exclusive type with many advantages. One-piece construction, no parts to lose; always threaded; no time lost in starting the nut. An easy unit for linemen to handle and install. Bolts forged and rolled for extra strength. Develops approximately 10 pounds compression for every inch-pound of wrench torque. Binding action of vise-type construction gives a vibration-proof connection. High salvage value. Made of Everdur (bronze) for copper connections and plated Everdur for all-purpose use on copper, aluminum, or galvanized iron wire. Available for wire sizes No. 8 to 1000 MCM.

Right, above: Fargo B-3 Lashing Wire Clamp: hot-dip galvanized malleable iron. One-piece construction. Holds lashing wire to messenger to its full breaking strength. For any size lashing wire and for messengers up to and including ½ inch (25M stranding).

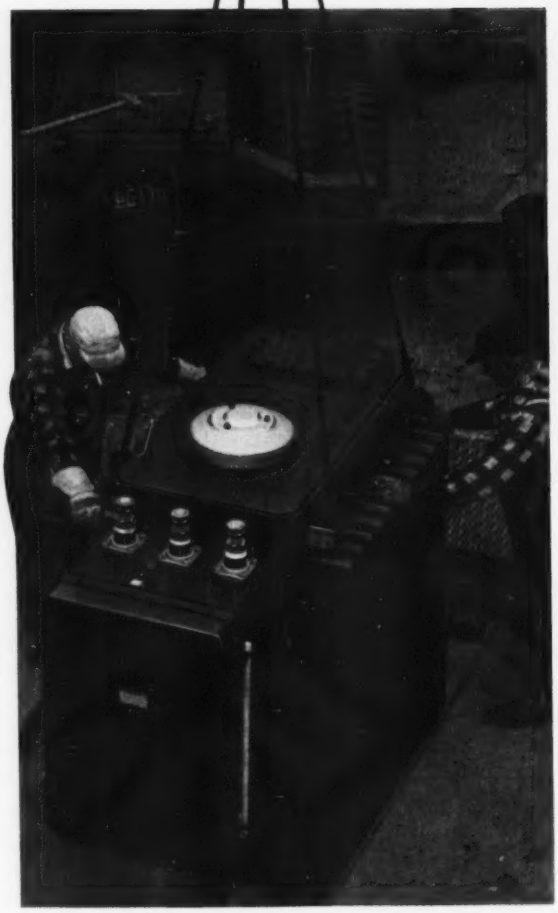
LINE MATERIAL Connectors

Complete Coordinated Equipment for Distribution Today

You can profit

from Manchester's Experience

Quick, Easy Expansion with Westinghouse Network Transformers



Public Service Company of New Hampshire envisioned Manchester as a city sure to grow . . . power requirements certain to increase. That's why an underground secondary network system was installed . . . to give the flexibility needed to accommodate extensions, load shifts and future growth *economically.*

Already these predictions have come true. But the network system offered a simple solution. A number of new 500-kva Westinghouse Network Transformers were quickly and easily installed throughout the city.

Here's the transformer that offers greater savings in initial cost . . . and these *plus* features:

STANDARDIZED electrically and mechanically to meet industry requirements . . . to improve delivery and reduce costs.

CONTINUOUS WINDINGS with sliverless copper.

HIGH AND LOW-VOLTAGE COILS accurately centered to minimize short-circuit stresses.

SINGLE RESPONSIBILITY—transformer, network protector, rotary switch all supplied by one manufacturer.

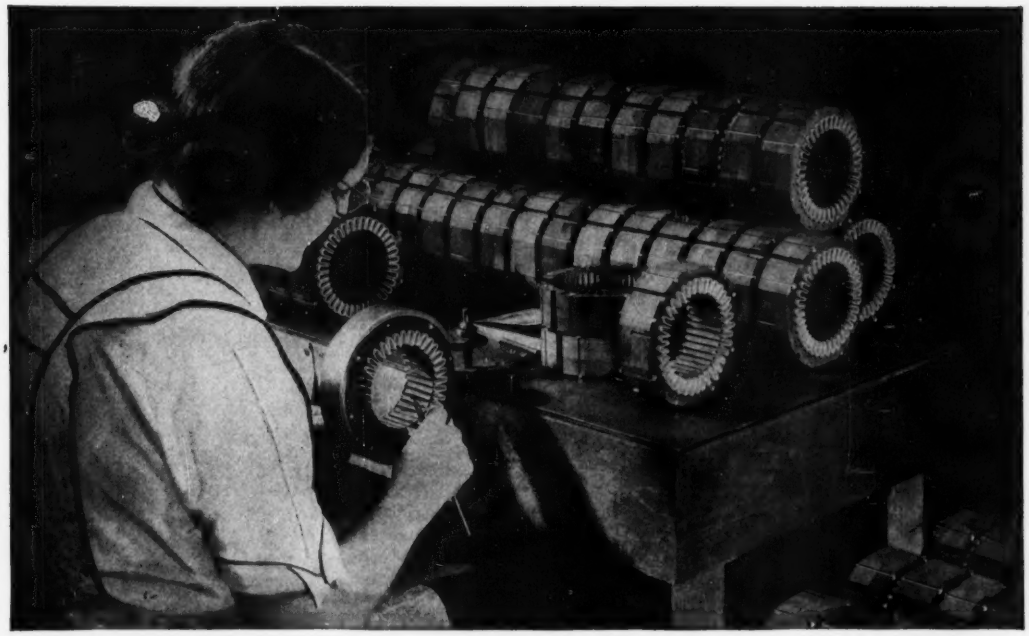
Westinghouse helped develop the network system over 29 years ago and has continuously pioneered new developments. Complete facilities including board analysis and competent engineers can help with your system planning. Call your nearest Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-70614

YOU CAN BE SURE... IF IT'S

Westinghouse

NETWORK TRANSFORMERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.



"Motors with IRV-O-SLOT insulation give year after year of service"

The Kingston-Conley Division of the Hoover Company uses Irvington IRV-O-SLOT insulation on its famous line of electric motors. Mr. A. E. Ott, Sales Engineer at Hoover, tells *why*:

"The high quality of the paper backing used in IRV-O-SLOT insulation has been fully proved by the many years over which our motors give satisfactory service. We find, too, that Irvington's slitting facilities give us greater flexibility in selecting paper widths, and allow us to shorten up our scheduling cycles."

These are among the reasons why IRV-O-SLOT has been the choice of many an electrical manufacturer, ever since Irvington introduced it as one of the *first* combined varnished-cambric-and-backing slot insulations.

The IRV-O-SLOT line now includes insulation for every slot requirement. Backing papers combine high dielectric and mechanical strength with ease of forming. Bonding adhesive allows enough "give" to prevent rupture of varnish film. IRV-O-SLOT literature is yours for the asking—just use the coupon below.

Send this convenient coupon now

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Gentlemen:
Please send me technical literature on IRV-O-SLOT insulation.

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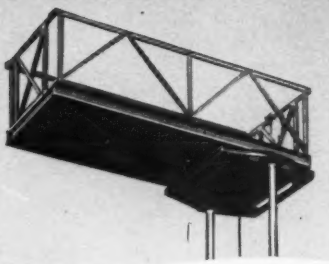
Represented in the Western States by C. D. La Moree, Los Angeles, Berkeley, Seattle, Portland; Electric Motor Supply Co., Denver

"The Accepted Standard with Utilities Everywhere"



Proved by many years of trouble-free service, *Powers-American* bodies set the pace as the number one choice with utilities everywhere . . . the measurement of top quality and performance throughout the industry. "Job-engineering" steps up crew efficiency, lowers operating costs . . . protects your investment. *Powers-American* has the type body and equipment to do your particular job most efficiently and at lowest cost.

HYDRAULIC TOWER

Platform extends to 30' above ground and can be revolved full 360°. Operation is controlled from truck cab or by workman on platform. Models are also available in ground-to-platform heights of 21' and 25' for installation on chassis having a rated capacity of 1½ tons or more.

LINE CONSTRUCTION BODY (600)

Available in 9' to 14' lengths, equipped to meet individual needs in any phase of utility work.

REVOLVING AERIAL LADDER

Models available in working heights of 23' 6", 26' 6", 30' 6", and 32' 6" for all styles of bodies.

LIGHT CONSTRUCTION BODY (SERIES 35)

Ideally suited for all types of light duty maintenance and construction work.

MAINTENANCE BODY (400)

Designed for medium duty general service. May be furnished with winch and derrick capable of handling 40' poles.

POWERS *American* DIVISION

ACF

PUBLIC UTILITY BODIES AND EQUIPMENT

McCABE-POWERS AUTO BODY COMPANY

432 Fifth Street, Oakland 7, California

There are many styles of *Powers-American* Bodies not shown here. Write for descriptive catalog today.

skyscraper of security

You can get extra safety from Security Tape. Its tight-grip adhesive coupled with high-tensile strength fabric make Security extra reliable.

Security tears straight and will not ravel. No pinholes to cause dangerous leaks. Security is both dependable and long-lasting—for electrical and general purpose jobs.

Ask your wholesaler for Security.

UNITED STATES RUBBER COMPANY

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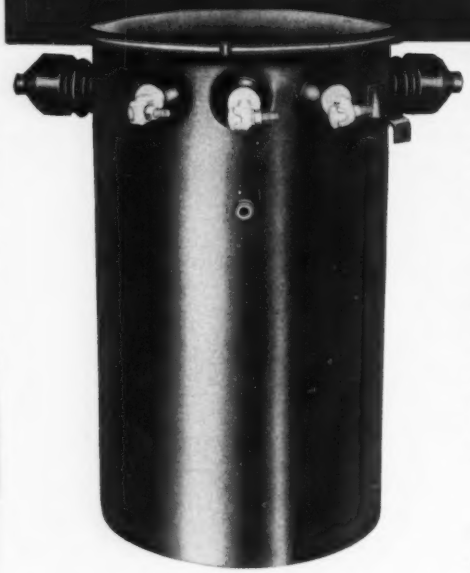
Wagner
TRANSFORMERS
...the choice of leaders
in industry

3 REASONS WHY

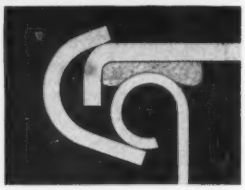
Wagner
Form W TRANSFORMERS
pay dividends in Extra Service



Wagner maintains 31 branch offices in principal cities for quick, convenient engineering service. Consult the nearest branch on your next transformer installation.

1 SHUR-SEAL COVER

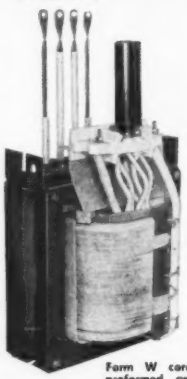
The new method of fastening the cover to the tank that provides true sealed tank construction. "Breathing" is prevented and no leakage of oil can occur. The SHUR-SEAL Clamping Ring maintains equal pressure *all around* the cover —yet permits easy removal of the cover by loosening a *single* stainless steel bolt.



The V-shaped cross section SHUR-SEAL Clamping Ring securely locks the cover to the tank to assure an air-tight seal.

2 IMPROVED CORE AND COIL DESIGN

Form W elements, with preformed cores of cold rolled, oriented grain steel permit the construction of small size, light weight, yet liberally designed transformers. Form W Transformers give excellent electrical performance — core and copper losses are low . . . short time overload capacity is high.



Form W cores are preformed and assembled in rectangular shape to provide a path for the magnetic flux parallel to the grain of the steel.

3 BUILT TO GIVE EXTRA VALUE

Wagner Form W Transformers are built the Wagner way—with the use of only the highest quality materials, carefully controlled production methods, and the skill acquired in sixty years of transformer building experience. That's why they pay dividends in longer service life.

® Wagner Electric Corporation 1891 WE 1951

WAGNER ELECTRIC CORPORATION
6381 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

TSI-9

these RLM lighting units...
INCANDESCENT
Lamp Used
RLM PORCELAIN ENAMEL DOME REFLECTORS Specification No. 1
RLM PORCELAIN ENAMEL DEEP BOWL REFLECTORS Specification No. 2
RLM PORCELAIN ENAMEL SYMMETRICAL ANGLE REFLECTORS Specification No. 3
100-w 150-w 200-w 300-500-w 750-1500-w
RLM HIGH-MOUNTING PORCELAIN ENAMEL REFLECTORS Specification No. 4
300-1500-w Gen'l Service Incandescent
400-w Mercury
RLM PORCELAIN ENAMEL GLASSTEEL DIFFUSERS Specification No. 18
200-w 300-500-w 750-1000-w
RLM HIGH-MOUNTING ALUMINUM REFLECTORS Specification No. 40
300-1500-w Gen'l Service Incandescent
400-w Mercury
FLUORESCENT
Spec. No.
Length of Unit
Lamps Used*
RLM TWO-LAMP OPEN-END PORCELAIN ENAMEL UNITS
9 48" 40-w or 38-w
11 60" 40-w, 85-w or 100-w T17
23 48" (shield) 40-w or 38-w
28 72" 58-w T12
30 96" 75-w T12
RLM THREE-LAMP OPEN-END PORCELAIN ENAMEL UNITS
10 48" 40-w or 38-w
29 72" 58-w T12
31 96" 75-w T12
RLM TWO-LAMP CLOSED-END PORCELAIN ENAMEL UNITS
5 48" 40-w or 38-w
7 60" 40-w, 85-w or 100-w T17
22 48" (shield) 40-w or 38-w
RLM THREE-LAMP CLOSED-END PORCELAIN ENAMEL UNITS
6 48" 40-w or 38-w
*black numbers are General Service, red numbers are Slimline Lamps

Assure You of the Kind of Lighting Performance Needed for...

Defense Production

Defense production demands the highest type of lighting performance to meet the wide range of seeing tasks, varied atmospheric conditions and difficult seeing conditions found today, as American Industry shifts into high gear. To meet these needs economically and dependably, the emphasis is on *uninterrupted* performance. Therefore it is important to specify units that can be depended upon to provide and *sustain* rated light output over years of service.

Specification of RLM Lighting Units provides finest assurance of efficient and uninterrupted lighting performance. The RLM Label is a warranty of conformance to *minimum standards* established by the Institute for lighting performance that meets most approved modern illuminating practices.

Shown here is a chart, listing the 34 different industrial lighting units for which the RLM Standards Institute has established specifications covering construction, finish, reflector design, ballasts and uniform quality. The Institute is currently engaged in the development of new specifications and revision of present standards in its effort to keep abreast of the latest advancements in illuminating engineering. To make certain of lighting performance that is the kind needed for defense production, specify lighting units certified to conform to RLM Standards of Quality.

FREE RLM SPECIFICATIONS BOOKLET brings you complete details on the many essentials of Defense Production Lighting. Your copy will be sent free on request to RLM STANDARDS INSTITUTE, Suite 815, 326 W. Madison St., Chicago 6, Ill.

CONFORMANCE to the ESSENTIALS of DEFENSE PRODUCTION LIGHTING Is Assured when you specify RLM-LABELED Lighting Units: High diffusion with high reflection factor • Top-quality porcelain-enameled reflectors • Approved reflector design • High power factor ballasts • Uniform quality of materials and construction • Conformance to National Electrical Code

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The letters RLM stand for Reflector and Lighting Equipment Manufacturers

B5621

CLEAN INSTALLATIONS. Individually mounted or grouped, wye or delta, whatever your standard wiring practice may be, you'll find it easy to design cleaner, safer installations with the new Westinghouse "CSP" Transformers.

Put Yourself ON THE SPOT

Where clearance means SAFETY

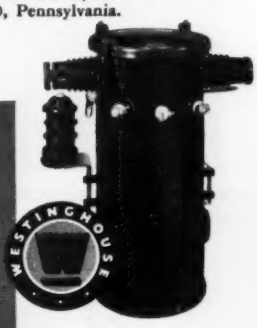
Put yourself in these shoes, high on a pole top where clearance means safety. That's where you'll appreciate the new Westinghouse "CSP"® Transformers with wall-mounted, high-voltage bushings that give you better working clearance—where they eliminate long loops that swing dangerously in the wind.

Try on these gloves, and you'll agree that it's important to have a large insulated knob to make hand-tightening easy, eliminating the need for tools.

Now back to the desk, where statistics talk best. Your own figures* can show you it's good business to standardize on "CSP" Transformers . . . to take advantage of this lower installed cost, better service continuity. Extra features like "Coastal Finish", bushings with unbreakable Enrup† knobs, and Wemco C-I (inhibited) Oil make it pay to specify Westinghouse "CSP" Transformers. J-70588

*If you have not yet made the detailed analysis of initial, installed and maintenance costs of "CSP" Transformers on the basis of *your own figures,* ask your Westinghouse representative for a copy of the check chart, B-4247B, "Transformer Costs and Their Relation to Profits". He'll be glad to give you details on the new product features, too. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

†T. M. Reg. U. S. R. Co.



YOU CAN BE SURE.. IF IT'S

Westinghouse

"CSP" DISTRIBUTION TRANSFORMERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

V.C. CABLE

Wherever you need resistance to heat, oil and grease . . . specify Roebling Varnished Cambric

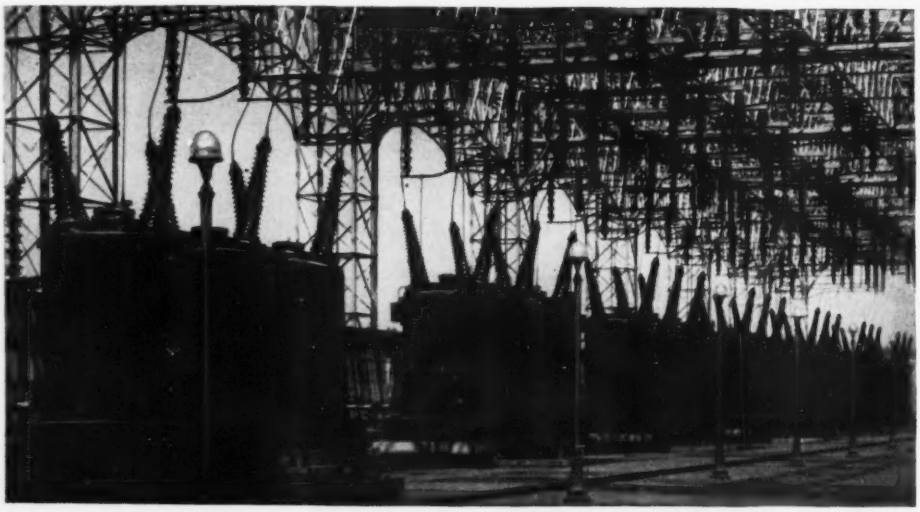
AS LEADS for generators, transformers, motor and oil switches . . . for general distribution of heavy power loads in manufacturing and industrial plants, your top specification is Roebling Varnished Cambric Cable. . . . Roebling V.C. is made in single conductor sizes from 2,000,000 C.M. to #14 A.W.G.; in multiple conductor sizes from 750,000 C.M. to #14 A.W.G. It is recommended for use up to 17,000v between phases in single or multiple conductor construction; and to 26,000v for single conductor grounded neutral.

Large quantities of Roebling's complete wire and cable line are now required in the rearmament program. The Roebling organization and distributors will do their best, however, to meet your delivery needs. John A. Roebling's Sons Company—San Francisco—Los Angeles—Seattle.

Manufactured with solid conductors or stranded in a variety of strandings, coated or uncoated, according to your needs. Available in single or multiple conductor.

Insulated with varnished cambric tape, in accordance with I.P.C.E.A. and Underwriters' specifications unless otherwise specified by you.

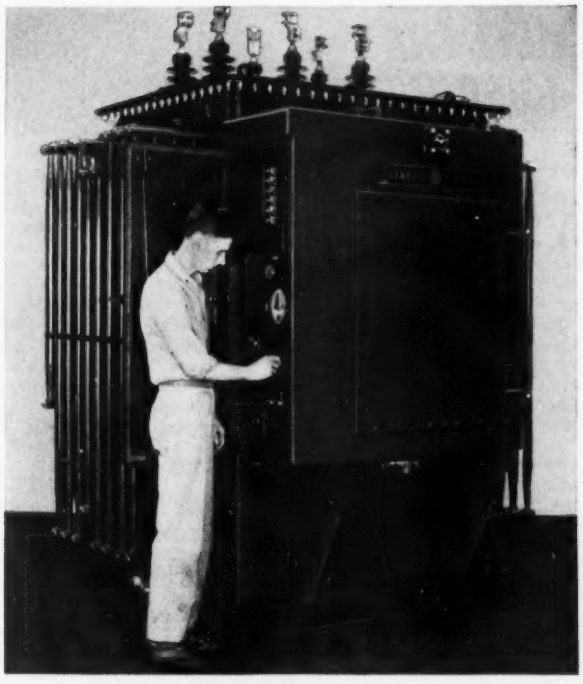
For outside covering you have a choice of braid, for service in dry locations; lead, for service in damp locations; and for aerial use or direct burial we recommend a protective armor such as steel tape or galvanized round wire armor.



ROEBLING

Atlanta, 934 Avon Ave ★ ***Boston,*** 51 Sleeper St ★ ***Chicago,*** 5525 W. Roosevelt Rd ★ ***Cincinnati,*** 3253 Fredonia Ave ★ ***Cleveland,*** 701 St. Clair Ave, N.E. ★ ***Denver,*** 4801 Jackson St ★ ***Detroit,*** 915 Fisher Building ★ ***Houston,*** 6216 Navigation Blvd ★ ***Los Angeles,*** 216 S. Alameda St ★ ***New York,*** 19 Rector St ★ ***Odessa, Texas,*** 1920 E. 2nd St ★ ***Philadelphia,*** 230 Vine St ★ ***San Francisco,*** 1740 17th St ★ ***Seattle,*** 900 1st Ave, S. ★ ***Tulsa,*** 321 N. Cheyenne St ★ Export Sales Office, ***Trenton, N. J.***

Class I Accuracy in these G-E Regulators —at no extra cost



GENERAL ELECTRIC'S TYPE MLT three-phase 32-step regulators are available in standard ratings for circuits up to 25,000 kva and 69,000 volts.

GENERAL ELECTRIC'S TYPE IRS induction voltage regulators provide the finest regulation obtainable for heavily loaded, urban feeders.

This means better utilization of your feeders . . . they can now carry heavier loads for greater distances.

Because of today's increasing power demands on your feeders, General Electric is especially proud to be the leader in bringing you this significant new system design tool at NO EXTRA COST!

The controls on all station-type feeder voltage regulators now meet rigid ASA Standards for Class I devices. This means that they have an accuracy of at least 99%—regardless of operating changes in temperature, frequency, or load.

With these highly accurate controls on your regulators, more drop can be tolerated in a regulated feeder without at any time exceeding established voltage limits. Therefore your older feeders can carry heavier loads and your new construction can be designed with this increased load-carrying capacity in mind.

For further information on what Class I accuracy can mean to you, get in touch with your G-E representative. *General Electric Company, Schenectady 5, New York.*

404-82

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

ELECTRA'S HUSBAND

"YOU can now raise pigs without mothers," Electra commented one evening recently. "It says right here in this story in the *Wall Street Journal* that you brought home."

"Now wait a minute," I countered. "Science has accomplished many miracles but not that one. A dairy farmer can raise calves without having a bull within a thousand miles of his farm, but piglets without mothers—never."

"If just for once you would let me finish when I start talking, you wouldn't display such gross ignorance," she chided. "I did not say that the pigs were not produced in a perfectly natural fashion. What happens is that they are weaned as soon as they are born and the mother never sees them again. They are raised in electric brooders and fed a newly developed artificial sow's milk."

"Go on; I'm all ears."

"So is a jackass," she said before continuing. "The artificial milk is called Terralac and is made from skimmed cow's milk, extra fat, vitamins and terramycin. That is a new antibiotic, in case you don't know. According to the story it already is being used successfully to insure the health and speed the growth of pigs, chickens and turkeys."

"I've read about those experiments," I interrupted. "I wonder how it would work on humans. Could you grow some extra big football players by feeding the stuff to youngsters? I might pass that idea along to some Stanford alumni I know."

"The scientist who conducted the experiments with the new artificial milk developed some other interesting techniques," she continued, ignoring my interruption. "He has a recording that he calls a 'pig symphony.' It's a record which repeats the grunts of a mother pig and the squeals of the babies as they nurse. He plays this for two minutes out of every hour day and night so as to waken the little pigs and induce them to eat their Terralac.

"Then he has arranged a row of rubber nipples for the piglets who do not learn to drink when their noses are pushed down into a pan of the artificial milk. Apparently most of them learn to drink immediately without any nipples," Electra continued.

"The poor pigs," I sighed. "What's the angle of all of this or does the story say?"

"Why yes," she answered. "Soon farmers will be raising pigs just as they do chickens up Petaluma way or around Seattle. They'll have hatcheries where the sows farrow and then they'll have brooder houses where the little pigs will be raised in electric brooders and fed this synthetic milk. The same advantages apply as in raising chicks. The experiments with the piglets brought up in brooders on Tarralac showed a mortality of only about 5% as against 20 to 30% loss on the farm. The little pigs grow faster. Normally a piglet will weigh 28 lb at the end of eight weeks. Fed synthetically, the piglet will weigh 40 lb over the same period. Pigs can go to market 40 days earlier. Think what that saves in feed. Finally the sows can farrow three litters a year instead of two."

Piglets Without Mothers and Electric Blankets for Calves

"In another four or five years the scientists will make synthetic pigs," I groused. "I heard a speaker not long ago say that in two more generations Americans will be fed, clothed and housed with synthetic materials or processes. I'm beginning to believe he was right. Maybe by that time there will be synthetic men."

"Let's hope not," Electra concluded.

PROBABLY because of her early life on a ranch, Electra still reads the farm magazines. She clips out the stories that feature new and novel adaptations of electrical equipment. Not long ago she gave me a good story from John Pickett's *California Farmer*. It told how the wife of a Tuolumne County cattle raiser had placed a $320 value on her electric blanket. According to the magazine story the thing happened this way:

It seems that in order to improve the breed, this Hereford cattle raiser was experimenting with Brahmas from India. He had several Brahma calves. One day two of them fell into the ranch's 20x20x14-ft reservoir. In attempting to climb out over the concrete walls, both calves were severely cut and lost considerable blood.

Normal first aid treatment appeared to fail once the calves were rescued. They were suffering from exposure, shock and loss of blood and were shivering from chills. Attempts to warm them with a small electric heater were futile.

Showing the ingenuity and originality for which Western farm people are noted, the farmwife marched into the house and took the electric blanket from the bed. She spread it over the two calves and turned the control to "high." The results were immediate. The animals stopped shivering and appeared to relax. Shortly they were apparently normal. However, the housewife gave them two extra hours of heat treatment for good measure. Then their wounds were bandaged and each was given 300,000 units of penicillin. The story said that within a few days they were well and fit.

Although the blanket was badly soiled from blood and dirt, the farmwife was not too concerned. She could purchase a lot of electric blankets with the $320 saved by preserving the lives of the two calves.

I told Electra that for my part, I wouldn't share my electric blanket with any critter. The comfort it gives with its June in January warmth is too precious.

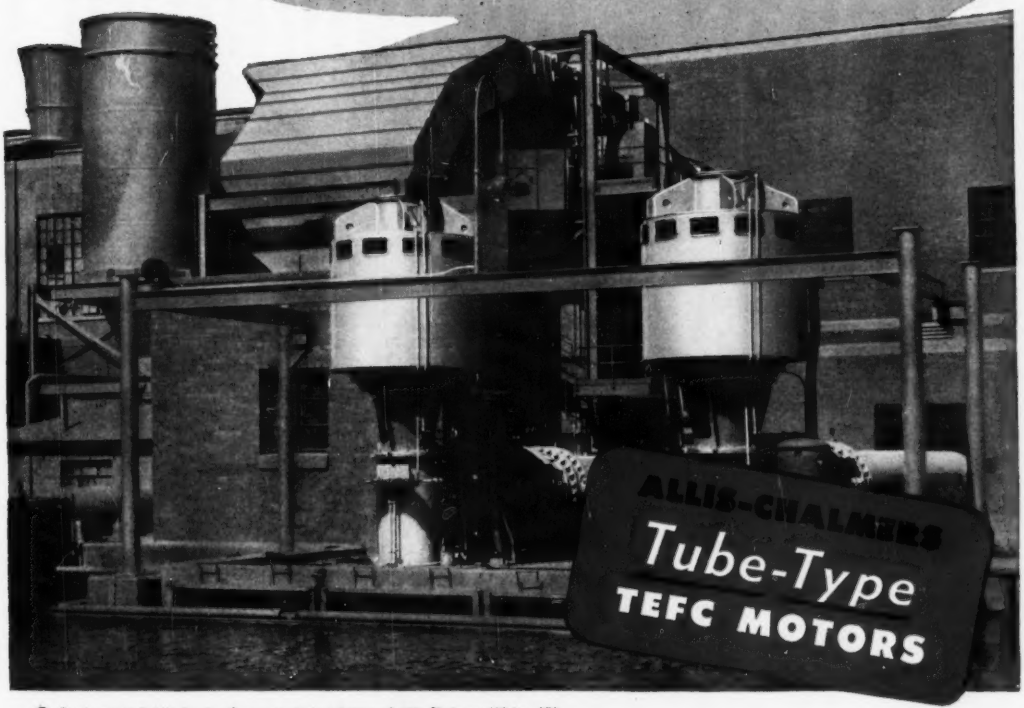
* * *

As an apt and cogent slogan this anonymous one found by Electra during her reading rates a prize:

"The man who won't read has no advantage over the man who can't read."

It is her opinion that TV may result in a race that will be hard put to read anything. This contention is denied by ardent TV fans. One of our acquaintances insists his three-year-old can read some of the commercials. Electra insists that the child repeats them from memory.

Open Sky
IS ALL THE ROOF THEY NEED



● Southwestern Public Service Corporation's installation of Allis-Chalmers 400-hp, 870-rpm vertical *tube-type* TEFC motors driving Allis-Chalmers pumps at Amarillo, Texas.

What does it cost to house a motor? Nothing — if it's an Allis-Chalmers *tube-type* totally-enclosed fan-cooled motor. Then the sky is roof enough. And it need not be blue sky either.

These motors aren't afraid of fog, rain, snow, salt, coal dust, soot, alkalies, or mild acids in the air. They're built to take care of themselves . . . and to save you money. The opportunity for low installation cost is only the beginning. Peak reliability and low maintenance pay worth-while dividends throughout the long life of the motors.

Why? Because their *tube-type* air-to-air heat exchanger design offers you these advantages:

1. *Self-cleaning action* . . . result of generous flow of outside air through smooth, straight cooling tubes.
2. *Complete enclosure* . . . protects stator core and other electrical parts from dirt and corrosion.
3. *Full internal air circulation* . . . provides efficient, even cooling—makes large sizes practical.

These are proved advantages, for purchases have exceeded 170,000 hp in sizes from 250 to 2500 hp. Introduced in 1946, *tube-type* motors are now available down to 40 hp at 600 rpm.

Bulletin 05B7150 describes these motors that are equally at home indoors or out. Call your A-C representative, or write to Allis-Chalmers, Milwaukee 1, Wisconsin. A-3534

Also available in horizontal designs.

ALLIS-CHALMERS

BENJAMIN

Only "Magna-Flo" brings you this

exclusive combination !

1 *the latest advancement for*

highest lighting efficiency

...T12 SLIMLINE LAMPS*

* These instant-start, single-pin lamps have a higher light output than other fluorescent lamps—as much higher as 10% or more lumens per watt! "Magna-Flo" units are specifically designed to get maximum efficiency out of these lamps. Shallow socket design of exclusive "Springlox" lampholder assures maximum light output through minimum blocking of light.

2 *the latest advancement for*

lowest maintenance costs

..."SPRINGLOX" LAMPHOLDERS

"SPRINGLOX"
cuts maintenance costs two ways.

- **speeds maintenance**
- **prolongs lamp life**

R6751

You get the maximum lighting efficiency out of the T12 lamp *PLUS* all the maintenance advancements of "Springlox" lampholders . . . that's the *exclusive combination* of Benjamin "Magna-Flo"! Only with "Magna-Flo" can you get *BOTH* in one unit . . . and you get both at *no extra cost!*

Send for FREE "Magna-Flo" bulletin; contains complete data on this high efficiency unit with the *exclusive Benjamin Combination!*
Benjamin Electric Mfg. Co., Dept. J. Des Plaines, Illinois.

"Springlox" lampholders are standard equipment with all "Magna-Flo" units, which are available in open or closed-end reflector styles; for 2 or 3 lamps; 48", 72" or 96" long; in individual units or continuous lines.

DECEMBER 1951 Vol. 107, No. 6

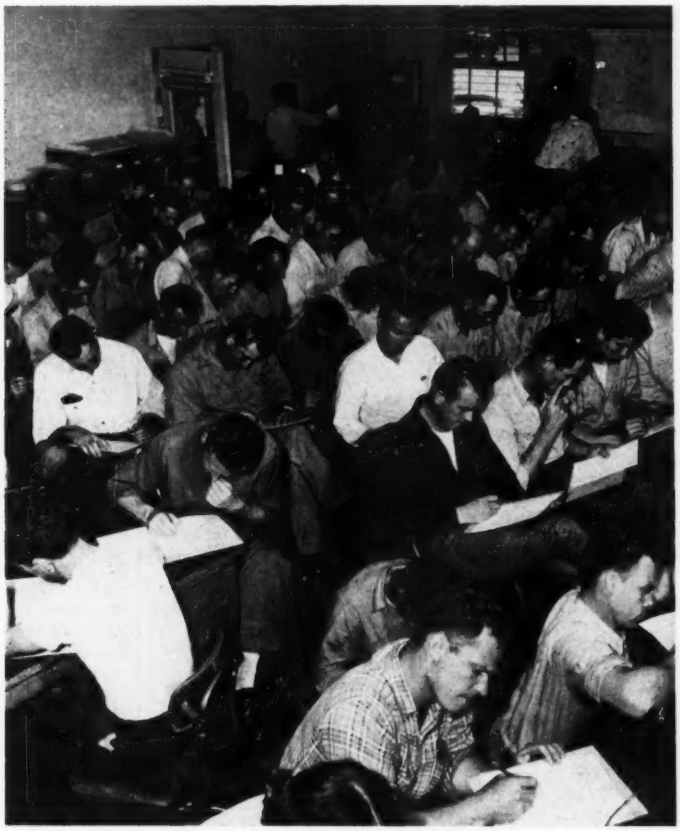
ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

Here's What Our Employee's Think

R. G. Kenyon

Vice-president
Southern California Edison Co.



Do your employees like their jobs?

What do they think of their bosses?

Where do they stand on the subject of seniority?

What do they think about government encroachment on the utilities?

To obtain answers to these and similar questions, the Southern California Edison Co. recently carried on a personnel survey which covered almost 90% of its seven thousand employees. The survey was carried out with the guidance and help of the Industrial Relations Section of the California Institute of Technology.

The fundamental problem of determining what questions should be asked was very carefully worked out. A searching analysis of the questions contained in many other surveys was made and every effort bent to make the Edison questions comprehensive and significant.

It was decided that the survey should be made in the field by having employees get together in small groups in their work areas. At these meetings the personnel survey was carefully explained and the questionnaires were filled out immediately.

Four two-man teams were established. Each team was composed of one man from the Edison company's Industrial Relations Department and a representative of Cal Tech. The series of meetings was carried on over the entire Edison system and the survey blanks completed all within 10 working days. There was no obligation on the part of any employee to fill out the questionnaire but all were *invited* to participate. As far as it can now be ascertained, the only employees who did not participate were those who were absent because of vacation, illness, or other reasons, on the day they would normally have met with the two-man team.

In the explanation to each group of employees, the hope was stressed that the survey would provide definite

Here is the Way Southern California Edison

Your job is important to you and the Company. We would like to know what you think about your job as a whole and about various aspects of it. Please check just ONE answer to each of the following questions.

6. What do you think of your job?

.3 ☐ (1) I do not like any part of it
1.1 ☐ (2) I do not like most of it
15.6 ☐ (3) Some parts of it I like; I don't like other parts
51.9 ☐ (4) I like most of it
30.4 ☐ (5) I like all of it
.7 No answer

7. How are the physical working conditions for your job?

1.9 ☐ (1) Many working conditions are disagreeable
19.9 ☐ (2) Some are disagreeable
55.5 ☐ (3) Satisfactory
21.7 ☐ (4) Excellent
1.0 No answer

Indicate those which are disagreeable .....

.....

.....

8. What do you think the Edison Company pays for other jobs comparable in difficulty and responsibility with yours?

1.1 ☐ (1) Compared with salaries paid comparable jobs in the Company my salary is high
43.9 ☐ (2) In comparison with others in the Company my salary is about right
26.5 ☐ (3) A few other comparable jobs in the Company receive higher salaries
14.9 ☐ (4) Compared with most others in the Company my job is not paid a fair salary
11.5 ☐ (5) No opinion
2.1 No answer

9. What do you think other companies pay for jobs comparable in difficulty and responsibility with yours?

41.5 ☐ (1) Other companies pay more for my job
30.8 ☐ (2) Other companies pay about the same
4.3 ☐ (3) Other companies pay less
21.5 ☐ (4) No opinion as to what other companies pay
1.9 No answer

10. What do you think about the training and preparation offered to you by the Company?

1.2 ☐ (1) It takes too much time and is unnecessary
45.7 ☐ (2) It is an effective help to me in the performance of my duties
14.4 ☐ (3) It is neither good nor bad
29.4 ☐ (4) It is inadequate and should be improved
9.3 No answer

Have you answered or checked ALL questions on this page?

The following questions are about the supervision you receive on your job. Please check just ONE answer to each question.

11. Does your immediate supervisor let you know what he thinks of your work?

40.3 ☐ (1) I have a good idea as to what my supervisor thinks of my work
24.4 ☐ (2) My supervisor occasionally praises me or criticizes my work, but I am not too sure of what he thinks of my work as a whole
13.2 ☐ (3) I am criticized occasionally, but otherwise my work is not discussed
19.8 ☐ (4) My supervisor never lets me know what he thinks of my work
2.3 No answer

12. What do you think of periodic, private discussions with your supervisor to talk over your interests, ambitions, opportunities, and how you are doing in your job?

90.3 ☐ (1) I like the idea
4.6 ☐ (2) Don't care
2.6 ☐ (3) I do not like the idea
2.5 No answer

13. The Employee Qualification Reports, which are filled out periodically by all supervisors, are intended to be helpful in bringing about better understanding between the supervisor and those supervised. Do you believe these reports:

33.5 ☐ (1) Are helpful for everyone concerned
48.9 ☐ (2) Probably do some good
2.7 ☐ (3) Are a poor idea and take too much time
5.3 ☐ (4) Are harmful and should be discontinued
9.6 No answer

Please write in any suggestion or comment about the program you care to make

.....

.....

14. How well does your immediate supervisor explain Company policies?

38.3 ☐ (1) He usually explains everything carefully and fully
31.7 ☐ (2) Sometimes he explains quite well
12.8 ☐ (3) His explanations are not very clear
13.5 ☐ (4) He never bothers to explain
3.7 No answer

15. How well have your duties and responsibilities been explained to you by your supervisor?

4.6 ☐ (1) He has never explained any of these things
41.6 ☐ (2) He told me some; I picked up the rest
33.4 ☐ (3) He has given me an adequate explanation
17.8 ☐ (4) He has given me a full and complete explanation
2.6 No answer

16. How does your supervisor handle your problems in connection with your work?

1.4 ☐ (1) He won't listen to me
6.2 ☐ (2) He'll listen, but won't try to help
31.4 ☐ (3) He'll listen and occasionally make constructive suggestions
52.6 ☐ (4) He is nearly always able to be helpful
5.7 ☐ (5) I do not discuss my problems with him
2.7 No answer

Employees Answered Some of the Questions

17. What is your supervisor's attitude on safety?

46.1 ☐ (1) He always stresses the importance of safety

20.1 ☐ (2) He usually stresses safe methods

5.9 ☐ (3) He slights safety somewhat

1.4 ☐ (4) He has no apparent interest in safety

23.8 ☐ (5) I do not know because safety is not a significant factor in my working conditions

2.7 No answer

18. How do you rate your supervisor on each of the following?

				No Ans.
a. **Plays favorites**	(1) ☐ Never	(2) ☐ Sometimes	(3) ☐ Frequently	
	45.2	36.5	10.6	7.7
b. **Passes the buck**	(1) ☐ Never	(2) ☐ Sometimes	(3) ☐ Frequently	
	50.0	32.6	8.7	8.7
c. **Keeps promises**	(1) ☐ Usually	(2) ☐ Sometimes	(3) ☐ Seldom	
	73.8	15.1	3.2	7.9
d. **Passes on pertinent information**	(1) ☐ Usually	(2) ☐ Sometimes	(3) ☐ Seldom	
	50.4	25.2	14.0	10.4
e. **Receptive to new ideas and suggestions**	(1) ☐ Usually	(2) ☐ Sometimes	(3) ☐ Seldom	
	52.0	28.9	12.7	6.5
f. **Takes credit for others' work**	(1) ☐ Never	(2) ☐ Sometimes	(3) ☐ Frequently	
	57.5	23.0	7.7	12.0

This group of specific questions relates to the facts you know and the opinions you and others have, of the Company as a whole. Please check just **ONE** answer to each of the following questions.

19. How would you rate the Edison Company on providing steady work?

78.5 ☐ (1) One of the best

18.0 ☐ (2) Good

2.6 ☐ (3) Average

.1 ☐ (4) Poor

.0 ☐ (5) One of the worst

.8 No answer

20. How fairly do you feel that promotions are handled?

1.9 ☐ (1) Promotions are never handled fairly

6.8 ☐ (2) Promotions are not usually handled fairly

17.2 ☐ (3) Promotions are handled fairly about half of the time

61.3 ☐ (4) Promotions are usually handled fairly

9.3 ☐ (5) Promotions are always handled fairly

3.5 No answer

21. What statement best describes your opinion as to the factors which should be considered in selecting people for advancement:

8.0 ☐ (1) The person with the most seniority should get the promotion if he can get by in the higher job, even though someone else could handle it better

32.5 ☐ (2) Ability and seniority should be considered equally

49.1 ☐ (3) Promotions should be made primarily on the basis of ability and qualifications, but seniority should be considered

9.1 ☐ (4) Promotions should be based entirely on ability to handle the job and capacity for further advancement

1.3 No answer

22. Do you know in general what work is done in other departments of the Company?

4.9 ☐ (1) I know what work is done in all departments

40.2 ☐ (2) I know what work is done in most departments

14.8 ☐ (3) I know what work is done in about half of the departments

31.1 ☐ (4) I know what work is done in only a few departments

7.7 ☐ (5) I know only what my department does

1.3 No answer

23. Does the Company keep you informed on its operations and problems?

.2 ☐ (1) I do not care to know about the Company

3.0 ☐ (2) I know very little about the Company

14.7 ☐ (3) I get some general information, but it is infrequent and incomplete

57.9 ☐ (4) I get a fair picture of Company operations, but would like to know more

22.0 ☐ (5) I get all I need

2.2 No answer

What information that you do not receive would you like to have?

.....

Have you answered or checked ALL questions on this page?

information. It was anticipated that this information would have real value to all levels of the Edison organization along the following lines: (1) that it would give to top management general information which would assist company officials in the matter of framing policy; (2) that all supervision would be better equipped to carry out company policy and better informed as to what supervisory techniques might be most helpful in providing good and effective administration; and (3) that the survey would serve to aid each individual employee toward better working conditions, a better understanding and a better informed relationship with supervision and his fellow workers.

In order to have the answers to the questionnaire statistically available, it was decided to limit the number of questions to that which could be placed on an IBM card. This limitation was actually advantageous in that it made it possible to get greater use out of the survey itself.

The company insisted that every employee be guaranteed complete anonymity and security against possible reprisal for anything that might be said in answering the questionnaire. To get this idea over to the people, it was clearly explained and demonstrated that no Edison employee would at any time handle any of the questionnaires. As the individual in the local group completed his questionnaire, he was free to leave the room, and as he left there was a slotted box labeled "Property of Cal Tech" at the door. Each employee dropped his survey into that box, which was in the charge of a Cal Tech man.

Five questions in the survey had direct bearing on the job itself. Eight questions dealt with the supervision received by the individual. Three questions pertained to employee opinion of government policies as they affected the individual, the company, or both. Thirteen were specific questions relating to the facts known by the individual employee and the opinion that he and others might have of the company as a whole.

The general question, "What do you think of your job?" was answered as follows:

1. Like none	.3%
2. Like some	1.1%
3. Like half	15.6%
4. Like most	51.9%
5. Like all	30.4%
6. No answer	.7%

A series of questions tending to indicate the opinion that an individual employee held of his own supervisor was answered with a solid plus for the supervisors. A complex question,

24. What does your family think of the Edison Company?

- ☐ (1) They think it is the best place to work
- ☐ (2) They think it is a good company to work for
- ☐ (3) They do not care one way or the other about the Company
- ☐ (4) They do not like it as well as some other companies in the Community

25. Do you read the EDISON NEWS?

- ☐ (1) I never read it
- ☐ (2) I just skim through it briefly
- ☐ (3) I read about half of it
- ☐ (4) I read most of it
- ☐ (5) I read all of it

Suggestions for improvement _____

26. Listed below are a number of policies and working conditions which have been established by the Company.

(a) Check in the first column what you consider to be the five most important to you.
(b) Check in the second column the three you consider least important to you.
(c) Check in the third column the three you consider best carried out by the Company.
(d) Check in the fourth column the three you consider worst carried out by the Company.

		Relative Importance of Items to You		Appraisal of How the Company Carries Them Out	
		(a) Five Most Important	(b) Three Least Important	(c) Three Best Carried Out	(d) Three Worst Carried Out
Company social activities	(01)				
Edison Company Medical Plan	(02)				
"Edison News"	(03)				
Equitable pay for responsibility carried	(04)				
Good Supervision	(05)				
Holidays	(06)				
Leave for Military training (National Guard; Reserves)	(07)				
Leave of Absence for personal reasons	(08)				
Life Insurance Plan (Benefit Fund)	(09)				
Opportunity for promotion	(10)				
Opportunity to make suggestions	(11)				
Overtime Policy	(12)				
Parking facilities	(13)				
Personal time off for emergencies	(14)				
Recognition for good performance	(15)				
Regular work and steady income	(16)				
Reputation of the Company	(17)				
Retirement Plan	(18)				
Safety activities	(19)				
Sick Leave	(20)				
Training activities	(21)				
Type of associates in Company	(22)				
Vacations	(23)				

"How do you rate your supervisor on each of the following:

a. Plays favorites
b. Passes the buck
c. Keeps promises
d. Passes on pertinent information
e. Receptive to new ideas and suggestions
f. Takes credit for others' work"

shows that roughly 75% of the individuals had a favorable attitude toward their bosses. This leaves, of course, a substantial group of approximately 25% of the individual employees who have some question in their minds, ranging all the way from minor to complex disapproval of their particular boss.

On the question, "What statement best describes your opinion as to factors that should be considered in selecting people for advancement?," the following results were obtained:

1. Seniority alone	8.0%
2. Ability and seniority	32.5%
3. Ability first	49.1%
4. Ability alone	9.1%
5. No answer	1.3%

This answer is interesting inasmuch as there are two unions on the property, both of whom have insisted upon a fairly rigid seniority clause in their contracts. Their clauses provide that seniority shall have considerably more weight than the employee answers to this particular question would indicate were desirable.

The last page of the questionnaire carried these instructions: "This page is for any additional comments or suggestions you may care to make after you have completed the questionnaire." Approximately 2,500 employees took advantage of this opportunity to raise questions or make comments. Cal Tech made a typewritten copy of each of these written comments on a separate sheet of paper. These probably give as good an indication of the general attitude and viewpoint of the employees as do the answers to the formal questions themselves.

Following are a few typical examples:

"Not enough authority delegated below."

27. **Sick pay is payment for time not worked due to non-industrial illness or accident after one year's service. The cost of sick pay for me is paid:**
- ☐ (1) By the State of California
- ☐ (2) By employees through deductions for benefit plans
- ☐ (3) Entirely by the Company
- ☐ (4) In part by employees, in part by Company

28. **The Company pays what part of the cost of the Medical Plan:**
- ☐ (1) 1/4 (one-fourth)
- ☐ (2) 1/3 (one-third)
- ☐ (3) 1/2 (one-half)
- ☐ (4) 3/4 (three-fourths)
- ☐ (5) 9/10 (nine-tenths)

29. **Considering vacations, holidays, retirement plan, benefit fund, sick leave, and medical care, do you think the Edison Company:**
- ☐ (1) Is outstanding in the provision of benefits
- ☐ (2) Provides more and better benefits than most companies
- ☐ (3) Provides about the same benefits as most companies
- ☐ (4) Does not provide as much in the way of benefits as other companies
- ☐ (5) Is far below other companies in providing adequate benefits

30. **For year ending December 31, 1949, the Edison net income was:**
- ☐ (1) $101,793,987
- ☐ (2) 27,721,088
- ☐ (3) 13,061,916
- ☐ (4) 18,368,338
- ☐ (5) 20,353,003

31. **It is believed that it costs about $7,500.00 to supply the average worker in the United States with a place to work, tools, equipment, material and other things he needs on his job. How much do you think the Edison Company has spent to furnish the average Edison employee with these essentials?**
- ☐ (1) $ 2,700
- ☐ (2) 7,500
- ☐ (3) 34,000
- ☐ (4) 60,000
- ☐ (5) 80,000

The following questions cover the effect of certain government policies upon you and the Company. Please check only ONE answer to each question.

32. **Which of the following statements best describes your opinion about Federal, State, and Local Government engaging in business activities?**
- ☐ (1) Government should stay out of all business activities under all circumstances
- ☐ (2) Government should stay out of business except for some activities like the Post Office
- ☐ (3) Government should engage in business only to compete with monopolies and to lower prices
- ☐ (4) Government should own and operate public utilities
- ☐ (5) Government should own and operate essential major industries such as banking, petroleum, steel and coal
- ☐ (6) Government should own and operate all business activities

33. **What effect, if any, do you think that the following governmental policies would have on the continued success of the Company?**

	Good Effect	No Effect	Bad Effect
a. Further inflation	☐ (1)	☐ (2)	☐ (3)
b. Increased taxes	☐ (1)	☐ (2)	☐ (3)
c. Government sponsored Medical Program	☐ (1)	☐ (2)	☐ (3)
d. Higher unemployment insurance benefits	☐ (1)	☐ (2)	☐ (3)

34. **What effect, if any, do you think that the following governmental policies would have on you personally?**

	Good Effect	No Effect	Bad Effect
a. Further inflation	☐ (1)	☐ (2)	☐ (3)
b. Increased taxes	☐ (1)	☐ (2)	☐ (3)
c. Government sponsored Medical Program	☐ (1)	☐ (2)	☐ (3)
d. Higher unemployment insurance benefits	☐ (1)	☐ (2)	☐ (3)

"I feel that the company should make a better attempt to sell the company to the employees so that every employee might become an enthusiastic salesman for his company and for private enterprise."

"Employees and supervisors should be better informed on more of the problems of top management."

"This personnel survey is an excellent way for personal expression. However, I feel the Edison company and its supervisors with whom I work couldn't be more ideal."

"Now it is time for our division employees to visit one or two representative districts in the field to learn conditions under which they work and to understand their problems. A great deal of cooperation between general office and districts would occur."

"It doesn't appear to me that the employees have the same patriotic interest they used to have a few years past. Labor turnover appears to be higher. The employee should learn more about his company and I think that tours of production plants and other departments should be conducted and more of the functions of the company explained. Those interested would no doubt be willing to do that on their own time."

"More publicity on benefits to employees."

"I think this questionnaire was very adequate and is a very good thing because it gives the employee a chance to answer questions he would not have a chance to otherwise."

"The company has and is spending a large sum of money for supervisory training. However, results expected are not realized because instructions are not followed. Where I work new employees are hired and never taken around to be introduced to all employees. People are 'put' on the pay roll and the old employees have to wonder who they are."

A number of employees were very critical in their comments on the encroachment of government on the industry. The following are samples of this attitude:

"I feel the company could go much farther in telling the public about the private power industry. The government spreads a great amount of propaganda on its activities. I think private industry should have the same opportunity. If the general public knew more about its public utility service, they would not form erroneous opinions about our business."

"I am not in favor of most of the governmental policies now in effect. We should get away from the habit of letting government be the one benefactor and get back to the old American system of free enterprise and self-reliance."

"I have a high regard for the company I work for but due to government encroachments, what can I as an individual do to improve our position? The time has come when we as individuals must speak out and tell others of the dangers upon us."

A few offered suggestions regarding improvements in physical equipment. For instance, "Get something to replace P & B tape."

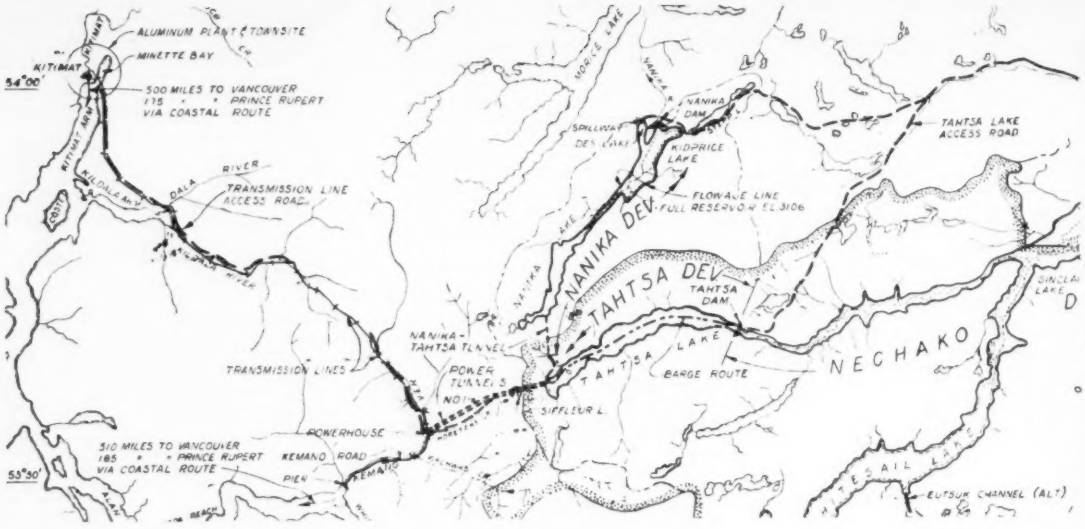
"Taking an over-all picture, the Edison company is above the average company to work for."

When the answers to the questions and the comments are taken into consideration, it is fairly evident that general conditions in the company range from "good" to "excellent" in the opinion of the employees. However, it is also evident in the company that there are practices and conditions that are disturbing to a fair-sized minority of the employees and therefore warrant careful analysis and attention.

Anyone familiar with personnel work and employee relations will, of course, recognize the fact that not all employees' gripes are valid. Whether the indignation is justified or not justified, just so long as the employee is entertaining this indignation, his effectiveness as a worker will suffer. From a management point of view, there can be no end to the ceaseless effort to eradicate either real or imaginary complaints in any organization if that organization intends to keep operating conditions at their optimium.

The survey was intended to help management, local supervision and employees, and we are convinced that it is accomplishing all three of these aims.

As to the over-all value of the survey, it is evident now that the cost and effort expended by the company was warranted and it is expected that more value will derive from this initial survey as time goes on. The reception with which the survey was met by the employees was particularly pleasing and the employees' apparent willingness to participate in such a research effort was highly gratifying.



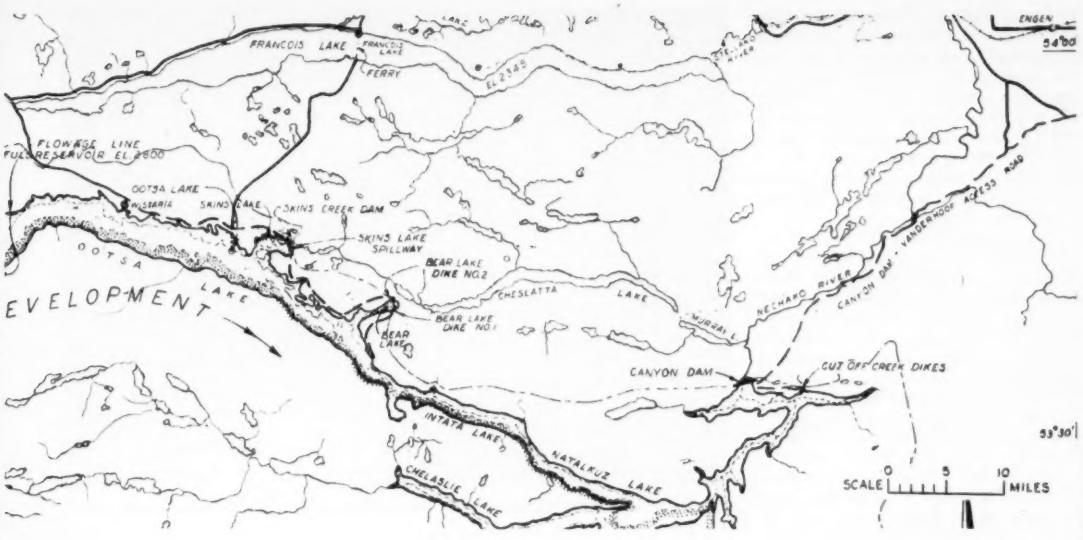
Flying in material for test span. Helicopter will be used in building permanent line

Alcan

Highlights of Alcan Project

- $500 million project
- Aluminum production of 500,000 tons annually
- 1,700,000-kw power development
- 19,000,000 acre-ft total storage
- 4,000,000 acre-ft live storage
- Flow of river reversed to another watershed
- Head 2,590 ft
- 140,000-hp, 4-jet impulse water wheels
- Power house excavated in solid rock
- Transmission line inaccessible half the year
- 850,000 kw carried per circuit at 287 kv
- 2.26-in. diameter ACSR conductor
- New town of 50,000 population
- Alumina shipped 4,500 miles from Jamaica

Spectacular in all respects the Alcan power and aluminum project in British Columbia is creating much interest in this country. This huge development of the Aluminum Co. of Canada, when completed, will include a 1,700,000-kw power plant, aluminum pot



Develops 1.7 Million Kw for Aluminum

lines with annual output of 500,000 tons and a town of 50,000 population. Ultimate cost will be half a billion dollars. First phase of the project, started last spring, will include dam, tunnel, power plant with three 106,000-kva units, transmission line, new town site and an aluminum plant with annual output of 100,000 tons. Alumina refined from bauxite in Jamaica will be shipped through the Panama Canal, a distance of 4,500 nautical miles. Contracts reported to total $168 million have been let.

Where is this unusual development located? As shown by the accompanying map, it is about 100 miles south of Prince Rupert, some 500 ship miles north of Vancouver, B. C., in and near Tweedsmuir National Park. The Cascade range in Canada in this area is rugged beyond imagination and the only level area for the new town and reduction plant is at Kitamat at the head of Douglas Channel, which is one of several ice-free fjords connecting with Queen Charlotte Sound.

Fifty miles by transmission line from Kitimat will be located the power house on the Kemano River. The power house, 1,000 ft long, 135 ft high and 80 ft wide, will be built in a cavern excavated in solid rock. Mile-long penstocks consisting of two

Drilling anchor holes for tower on Alcan's test span on 5,000-ft storm-swept Kildala pass

11-ft steel pipes will serve the first eight units in the plant, three of which are to be installed in this initial development. Penstocks will connect with a tunnel, one of an ultimate of two, that will be driven through the mountain range to provide a head of 2,590 ft. The tunnel will be 10 miles in length, of 25-ft horseshoe section, connecting with a high-level reservoir.

This reservoir will be created by building Canyon Dam, a 280-ft rock-fill dam on the Nechako River, which flows east into the Fraser, emptying into the ocean at Vancouver. The reservoir (100 miles long), interconnecting a number of existing mountain lakes, will have a total storage of 19 million acre-ft, the world's second largest, and a live storage for power generation of 4 million acre-ft. It is from the West end of this reservoir, or the opposite end from the dam, that the tunnels will carry the water through the Cascade range into another watershed that drains to the ocean through the Kemano River. The 1,600-ft, 32-ft-diameter diversion tunnel for the Nechako River Dam was completed in October of this year and other construction is progressing.

Nechako Canyon Dam site showing clearing and access grades to diversion tunnel portals

Power Plant

Initial installation in the power plant will be three 106,000-kva units, as stated. These will be driven by 140,000-hp, 4-jet, vertical impulse turbines, believed to be the largest impulse wheels ever built. Turbines will be supplied, one each, by the Pelton Water Wheel Co., Allis-Chalmers Mfg. Co., and Dominion Engineering Co. Ltd. The generators will be supplied, one each, from three manufacturers, Westinghouse, General Electric and English Electric. The first unit is scheduled for April 1, 1954, with the other two following at three-month intervals. Plans have not been announced for the next phase of the project.

Transmission Line

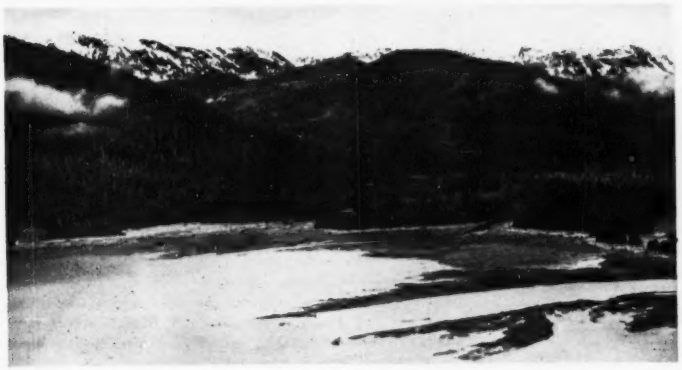
The transmission line presents one of the most difficult problems of the entire project. The transmission distance is short, only 50 miles, but the 10-mile, 5,000-ft Kildala mountain pass over which it must be built is so rugged and storm-swept that it is inaccessible to man, by any means whatever, for six months of the year. A test span erected on this pass went through the 1950-51 winter. Winds of 100 mph were recorded, but ice loading was less than expected, probably because of a rare mild winter.

The pass is so narrow that there is room for only two single-circuit tower

Power house site in Kemano River Valley showing the access road and temporary camp

Kemano Valley from summit of Kildala pass on route of Alcan's proposed 287-kv line

Transmission line route looking toward the Kildala River. Glacier in left foreground



Tide flats at Kitimat, site of smelter and town, which will have 50,000 population

lines. Although both lines are not needed for the initial development, they must be built at the same time because a second line could not be built with a hot line in operation. Consideration was given to driving a tunnel through the mountains for this 10-mile section and installing high-voltage cables, but the cost was considered prohibitive.

Circuit Loading of 850,000 Kw

Physical difficulties were not the only transmission problems. There was the problem of transmitting 1,700,000 kw over only two lines in this 10-mile section. That is 850,000 per circuit, a loading never before contemplated. A transmission voltage of 287 kv was chosen, using a 2.26-in. diameter specially designed ACSR conductor. This will be the largest transmission conductor ever built. Details of mechanical design for this section of line have not yet been worked out completely.

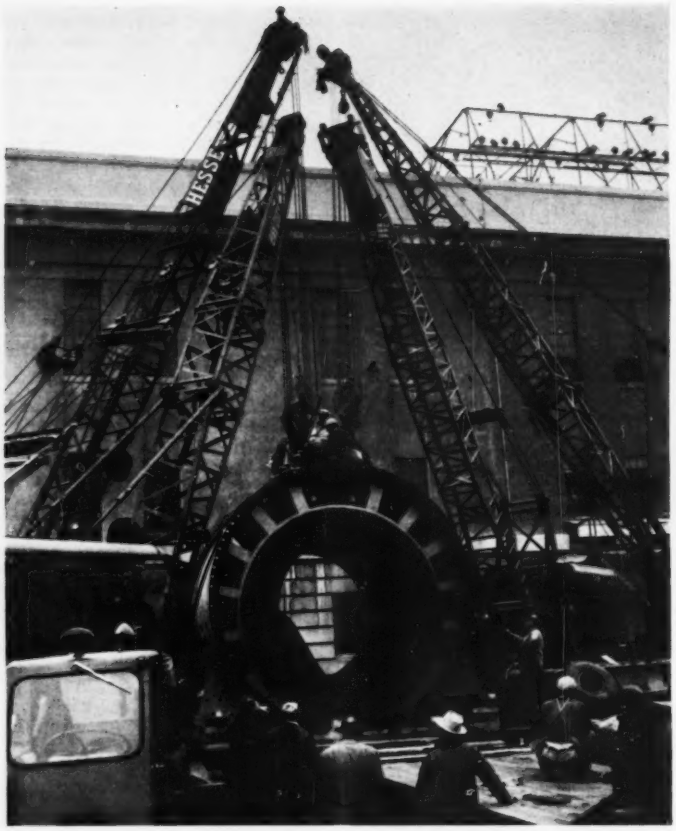
Concrete tower footings 20 ft high, the average snow depth, and steel towers, conductor and accessories all will be designed for an ice loading of 40 lb per ft, even though only a fraction of that loading was experienced in the test span last winter.

Greatest concern on this section of line is snow slides. These can be of tremendous proportions, literally sweeping mountains before them. By carefully studying tower locations to avoid slide areas, it is hoped to obviate the slide problem.

In the 10-mile section between the pass and the plant, where the country is less rugged and at lower elevation, there will be initially one double-circuit, and ultimately two double-circuit, steel-tower lines. Conductor here will be 1,590,000 cir mil ACSR. Likewise, in the 30-mile section between the pass and the plant at Kitimat, the country is comparatively open and will have similar lines.

From this brief account of the Alcan project, it must be agreed that it is an ambitious engineering undertaking, and truly spectacular. Alcan is probably the greatest single project ever undertaken by private capital. It is the result of the tremendous growing demand for aluminum and the necessity for a low-cost power supply to produce it.

Morrison-Knudsen Co. of Canada Ltd., an affiliate of Morrison-Knudsen Inc. of Boise, Idaho, is prime contractor on the hydroelectric project. Engineering design is in charge of the International Engineering Co. of San Francisco, C. P. Dunn, president, and its associated company, the British Columbia International Engineering Co. of Vancouver. P. E. Radley is project manager for Alcan.

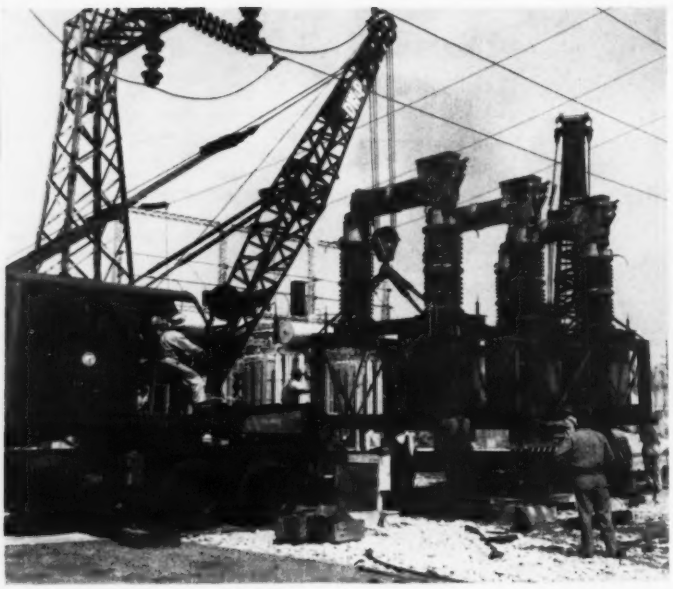


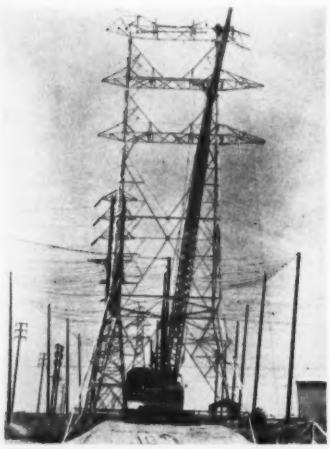
Extensive use of large cranes for heavy equipment moving jobs is made by the Los Angeles Department of Water & Power at large savings in time and labor —reports J. F. Mariscal, engineer of construction. Accompanying photographs show several such uses

At left is shown the 70-ton stator of a 40,000-kva synchronous condenser being unloaded from a low-bed trailer and placed in position on foundations by four mobile cranes. Total unloading and assembly on sole plates took only about eight hours

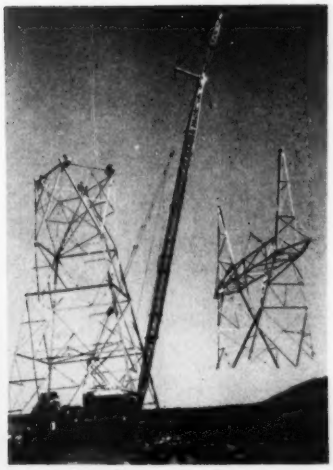
Lower left: Loading, unloading and placing on foundations of 123-kv impulse circuit breakers by use of mobile cranes. Work was carried on in energized station with certain buses dead. Method saved considerable time, money and possible breakage of porcelain when moving breakers a distance of six miles from one of the department's substations to another

CRANES





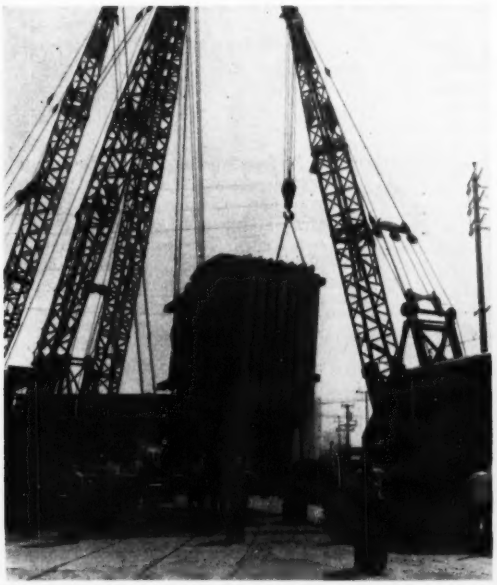
Above: Erecting 287-kv 4-circuit transmission tower with mobile crane. Tower is 177 ft high and dirt ramp was used to gain additional height for crane. Towers in line weigh from 18 to 36 tons. This erection method saved considerable time over topping off with gin pole, which was necessary in several cases. Mobile cranes have been used several times with large savings in picking up a transmission tower bodily and moving it to a required new location

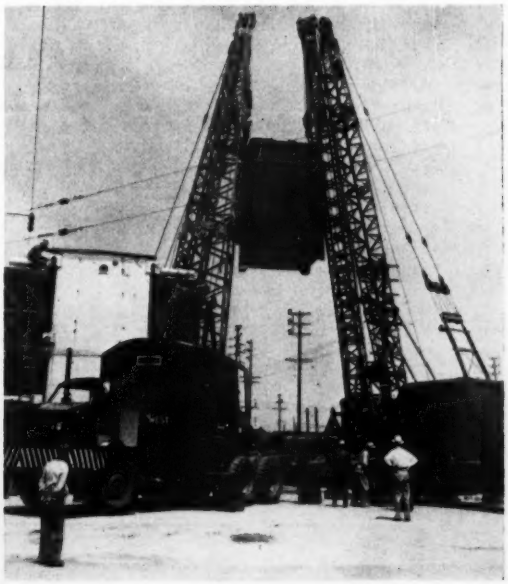


Above: Erection of 230-kv transmission towers by use of crane. Towers ranged in weight from seven tons for standard towers to 22 tons for transmission towers. All but four of the 1,274 towers on Owens Gorge transmission line were erected by cranes

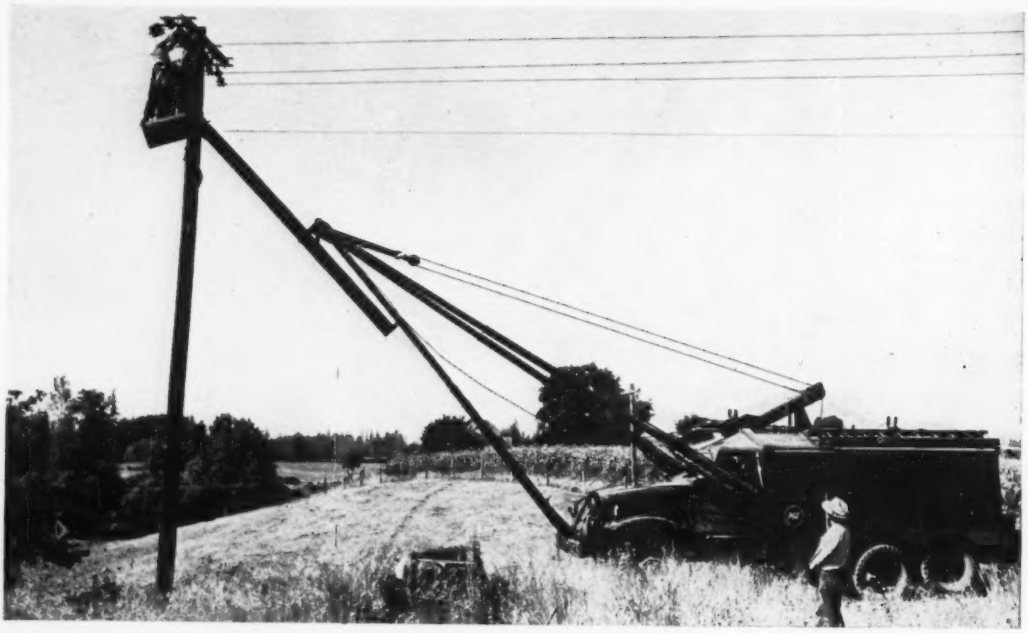
Above left: Unloading and placing in position on foundation the 65-ton rotor of a 40,000-kva synchronous condenser. Four mobile cranes with equalizing yoke are used

DO THE HEAVY JOBS





The two pictures above show other uses for mobile cranes. At left is shown a 40-ton transformer tank with radiator fins being unloaded from low-bed trailer and placed on transfer truck on rails. Four cranes were required. Note method of support. At right: Four cranes load and unload 80-ton transformer core in move across city. The core is shown being raised so that the tank (at left) can be rolled under core. Core is then lowered into case. This was effectively accomplished by use of four mobile cranes



Platform on wooden boom extension to front-mounted pole derrick is used advantageously in transmission and distribution line work

Front-Mounted Derrick Cuts Line Costs

P. E. Landsem

Superintendent Oregon City Division
Portland General Electric Co.

Hydraulic cylinders on side derrick legs permit derrick to be swung 10 ft either way

A front-mounted derrick has effected substantial savings in the Oregon City division of the Portland General Electric Co. during the past two years. The original units were designed for use with hole digging equipment, but the latest model incorporates the derrick with a line truck. Hydraulic pistons at the base of each side leg permit the derrick to be swung 10 ft to the right or left from center. Several views of this piece of equipment are shown.

The unit was built on an International 6x6 chassis. The frame was fish-plated and a double A-frame installed to support the derrick. The six-man cab was built around the derrick support. Derrick side legs are two 13-ft lengths of Shelby tubing and the center leg is five sections of Shelby tubing. The hydraulic pistons give enough additional length so that the derrick fully extended has a lift of 32 ft, but is only 11 ft above the ground in the traveling position.

Several types of work performed with front-mounted derrick. Left: Setting framed pole. Center: Clipping in. Right: Transferring wires

The driver and one man can extend the derrick in about two minutes. The equipment can lift and move loads up to 6,000 lb with the derrick fully extended. When working on soft ground dual wheels are used on the front to increase floatation. The outer tire is slightly smaller than the inner tire so that the truck will steer easily when traveling.

Derrick Extension

The derrick is used for a wide variety of line jobs by attaching an 18-ft laminated wooden extension. This extension, capable of lifting 1,000 lb, can be attached by two men in about five minutes. The extension permits putting two men 40 ft in the air for working on distribution or transmission lines. One of the accompanying photographs shows such use. A mast can be added to this extension, making it possible to raise a man in a boatswain's chair to 52 ft. Another photograph shows a man on this mast extension clipping-in on a 60-ft pole. A glass window in the roof of the cab enables the truck driver to see his derrick at all times and to maneuver it into exact position with the hydraulic pistons.

Has Many Uses

This equipment is used to great advantage for a variety of line construction jobs. Uses include pole setting, laying up conductor in stringing wire, transferring wires, cut-over work, installing transformers, and tree trimming. Using pneumatic tamps (Electrical West, November, page 77) a six-man crew on this truck will set and tamp 55-ft and longer fully equipped transmission poles at the rate of 15 poles or more a day. When travel time was short and soil conditions right, as many as twenty-six 55-ft poles have been set and tamped in a day.

When using the truck for pole replacement it is possible to pick a transformer off the old pole and set it on the new pole. It is also simple to transfer conductors because two men standing on the platform can untie the wires from pole and tie-in on the other pole, even if the poles are several feet apart. On one cutover job a four-man crew replaced 24 transformers in one day. On this job the new transformers had been delivered at the pole, and the old transformers were left to be picked up later.

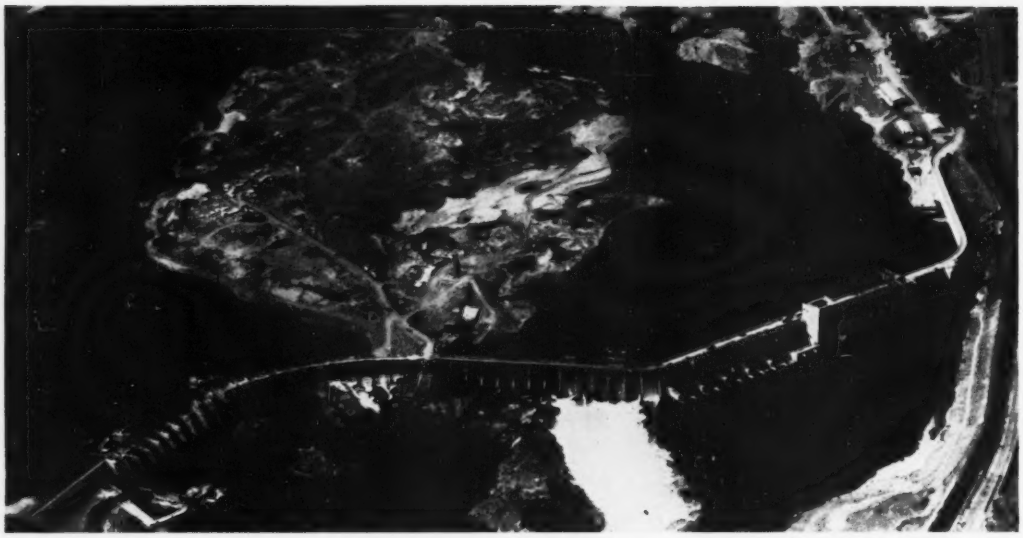
A number of jobs have been done installing transformers on racks. The derrick picks the transformer off the trailer and sets it on the rack in a matter of minutes. Three 200-kva transformers have been installed in 10 minutes and the three old transformers removed in five minutes. On one recent job done by a five-man crew, it was 30 minutes from the time the old bank was de-energized until the new bank was energized.

In stringing conductor on new construction or replacement, the derrick is extended to one side, a boom placed on it to extend out over the line, and with wires attached, the truck drives along the line, laying the wires up on the crossarm. The pay-out reels are equipped with individual brakes, so that the wires when strung out are practically sagged for tying-in. As many as four miles of three 2/0 ACSR conductors have been laid-up in this manner and sagged in a day.

When not busy on other work, a two-man crew on this equipment engages in tree trimming, or helps other gangs in cutover and other line work. Large savings have been effected in tree trimming work because the man is placed in advantageous position to trim the tree from the outside.

A rather remarkable job was done with this equipment this past summer. A two-man crew with the front-mounted derrick did a difficult job of setting a 70-ft pole through hot lines, a job that had been given up by a heavy line gang the day before. Exact maneuverability of the derrick, in full view of the operator, was the secret.

Our experience with this truck this year has convinced us that a five-man crew properly equipped can do at lower cost many jobs normally done by heavy gangs.



Rock Island Dam and plant of Puget Power on Columbia River which Chelan PUD is completing with a 165,000-kw addition

Chelan PUD to Complete Rock Island

E. C. Metcalf

Project Engineer
Public Utility District No. 1 of Chelan County
Wenatchee, Wash.

A fine example of cooperation between public and private power in the Pacific Northwest for the public interest is that between Public Utility District No. 1 of Chelan County, Wash., and the Puget Sound Power & Light Co. The PUD's new 165,000-kw power house will be erected on the foundations built in 1931 by Puget in the initial Rock Island development, near Wenatchee, Wash., which was the first power plant to be built on the main stem of the Columbia River. The dam additions are being constructed on the original foundations in accordance with the original design to raise the headwater to elevation 604 ft.

In 1948 Puget's properties in Chelan County, with the exception of the Rock Island hydroelectric plant, were acquired through negotiated purchase by the Chelan district. With the increase of defense industry in the Northwest and at direct request of Jess Larson, administrator, General Services Administration, to provide additional power capacity at Rock Island, agreements were negotiated between Puget and the district, whereby the company leased to the district the right to complete the Rock Island plant, and whereby Puget will operate the entire plant upon completion. Execution of the agreement with Puget was contingent upon a commitment by the Aluminum Co. of America to locate an aluminum reduction plant near Rock Island and take 120,000 kw of the power output of the new plant until July 1955, when that load will be transferred in steps to the Bonneville Power Administration. Thereafter the power will be shared by the district and Puget with the entire cost of power divided accordingly. A joint sig ing of the lease agreement, operating agreement and Alcoa power contract took place on April 26, 1951.

The addition to the Rock Island power plant facilities is a fundamentally sound business proposition, which Chelan district financed by issuing $33,600,000 of revenue bonds, purchased by private capital. The carrying charges on these bonds will be added to operating costs to determine the net cost of power, which will be shared by Puget and the district proportional to their respective use of power. Essentially this constitutes a "Service-At-Cost" contract, the development of which was made by R. W. Beck and Associates, utility analysts and engineers, and consulting engineers for the district.

Original Design

The Rock Island Dam was designed by Stone & Webster Engineering Corp., which constructed the original part for Puget and is engineering and supervising the completion of the dam and power house for the district. The dam consists of a flat concrete slab on the river bed on which rest heavy concrete piers. Steel gates, which may be opened wide during flood, close the 32 openings between piers. Fifty-four of these steel roller crest gates, each 30 ft long and 22.5 ft high, control 1,365.5 ft of spillway. The power house, built of reinforced concrete and structural steel, forms an integral part of the remaining dam structure and, when completed in 1953, will be 746 ft long, 114 ft wide and 162 ft in height

from bedrock to parapet, housing 10 generating units and one station unit of 1,750-kva capacity. Step-up transformers and transmission tower structures are mounted on the roof of the power house.

Two roller drop gates provide attraction for two fishways, one of which is located adjacent to each river bank. A third fishway is located near the center of the dam and extends along the left bank of Rock Island. The right and left fishways are 600 ft in length, 20 ft in width and built in 12-in. steps. Extensions are being made to the upstream end of the center fishway and other modifications are being made to provide adequate and suitable facilities for the passage of migratory salmon.

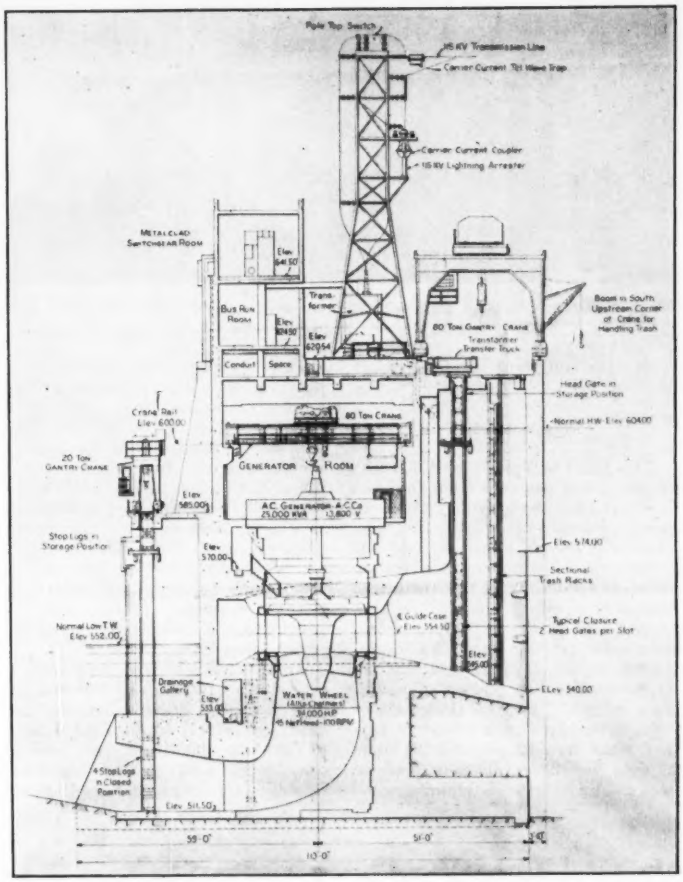
Initial Operation

Initial installation by the Puget company consisted of four 15,000-kw generators connected to four 21,000-hp propeller-type vertical-shaft waterwheels. Eighteen steel crest gates were installed on which have been placed 10 ft of flashboards to produce sufficient head for an output of 80,000 kw.

Project Completion

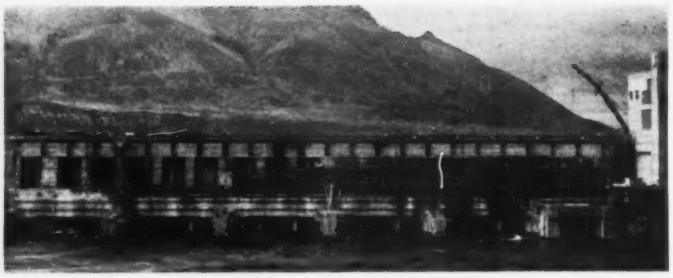
Chelan district now has under construction the completion of the dam. This involves raising the height of 21 piers in the west spillway, installing 36 additional steel crest gates, completing the concrete deck over the east and west spillways and installing one 80-ton gantry crane. The power house building will be extended 418 ft in length and will house six additional generating units. Hydraulic turbines will be Allis-Chalmers Mfg. Co., Kaplan-type, 34,000-hp 100-rpm machines designed for an average effective head of 45 ft, driving 25,000-kva 90% power factor, Allis-Chalmers generators, having a continuous guaranteed capacity of 28,750 kva. The 13,800-v generator bus will be housed in metal-clad switchgear using air circuit breakers for generator and transformer main circuits. Generator control will be carried to the one central control room to form one integral control station for the 10 units.

A transfer bus will connect the main station bus of the old and the new plant. The new generators will be arranged in groups of three, each group feeding through a 75,000/93,750-kva General Electric Co. 3-phase power transformer. These two transformers will connect with two 115-kv transmission lines having 636,000-cir-mil ACSR conductors extending 2.5 miles to the site of the Alcoa alumi-



Cross section of Rock Island power house extension showing typical unit arrangement

Work on dam includes raising piers, installing gates, placing deck and erecting crane



Plant extension is built on piers originally provided. Control will be from old plant

num reduction plant, located in Chelan County.

Aluminum Plant

This plant will produce 85,000 tons of aluminum per year from four pot lines, which will require a continuous power demand of 170,000 kw. The plant will occupy approximately 100 acres and will consist of a carbon plant in addition to the main pot lines. About 800 people will be employed. The plant will reduce aluminum oxide powder into metallic aluminum by the Hall process, wherein approximately two pounds of aluminum oxide, 10 kwh of electrical energy, five-eighths of a pound of carbon, some cryolite ore, and 36 hours of time will be required to produce each pound of metallic aluminum.

Power requirements for the four pot lines exceed the continuous firm power capability from the Rock Island addition by 50,000 kw. This will be supplied by the Bonneville Power Administration as interruptible power until after July 1, 1955, when Bonneville has contracted firm power to Alcoa. Bonneville's firm power commitment to Alcoa will be 60,000 kw beginning July 1, 1955; 90,000 kw beginning July 1, 1956, and 120,000 kw beginning July 1, 1957, at which time Bonneville will serve the entire Alcoa load.

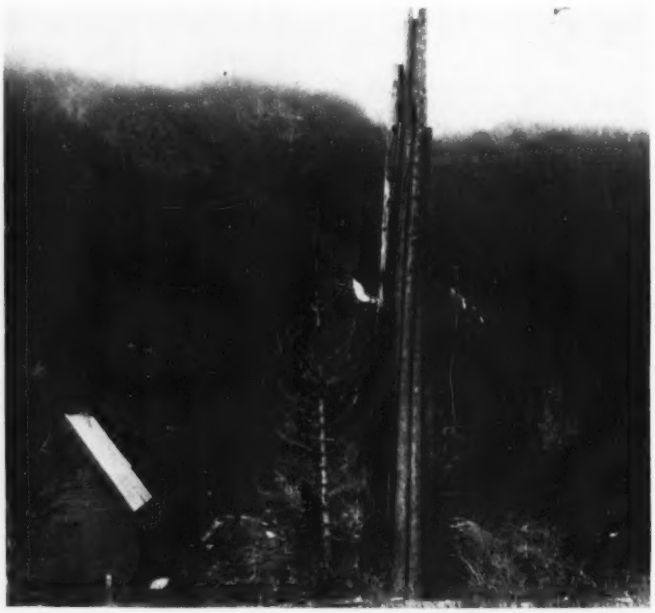
To effect this service, Bonneville is constructing two 115-kv transmission lines from Columbia substation, located six miles south of Rock Island, to the Alcoa plant site, and there is constructing a 190,000-kva step-down substation from 115 kv to 13.8 kv, the service voltage to the Alcoa plant. The two 115-kv transmission lines of Chelan district will tie to the Bonneville system at the 115-kv bus of this substation.

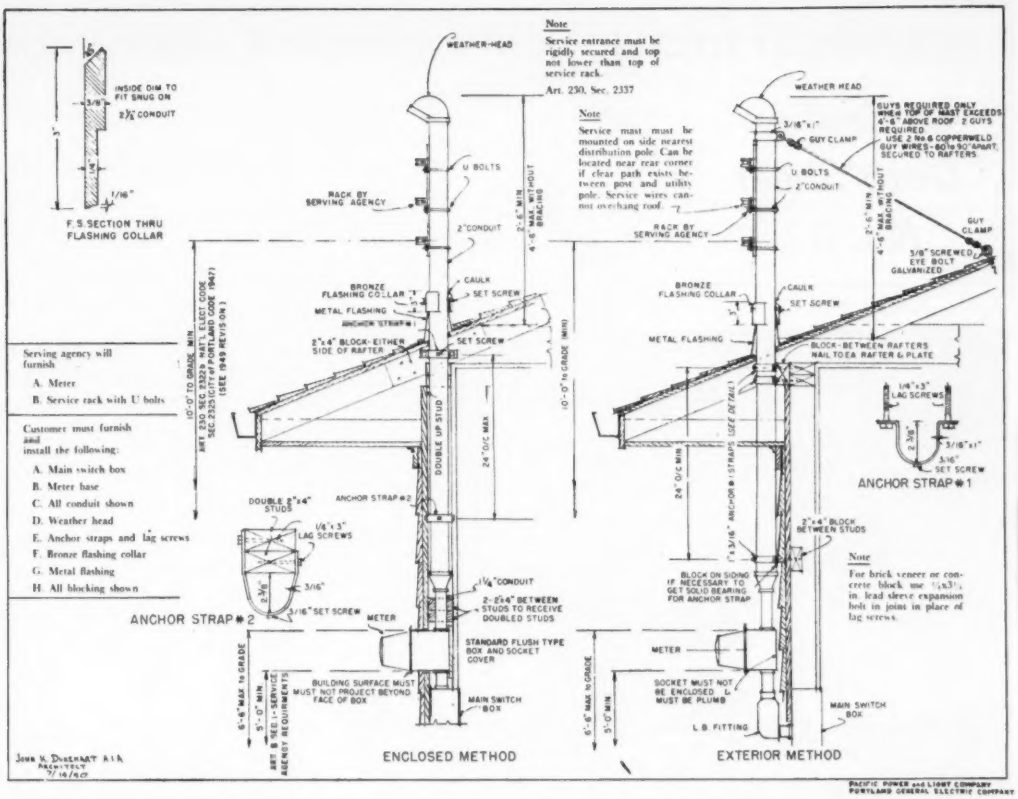
Stone & Webster Engineering Corp. has scheduled its construction to provide for operation of the first unit in the summer of 1952 with completion of the sixth unit during the summer of 1953. The Atkinson Ostrander Co. is now engaged in the concrete construction portion of the dam and the power house. Because Rock Island is a relatively low-head plant and sensitive to the wide variation in the tailwater elevations that are caused by variation in stream flow, its greatest output can be generated during the low-flow months of the Columbia River, which extend from September through April in an average year. The reduced output during the flood stage of the Columbia is not a critical condition because of excess generation during such periods at high-head dams on the Columbia and excess power generation during the spring months from hydro plants located on the west slopes of the Cascades. Because of the interconnection that the new Rock Island plant has both physically with the Bonneville system and the Puget system and contractually with both Bonneville and the Puget company, its operation will be coordinated as part of the Northwest Power Pool for mutual advantage of the entire area.

Vertical Pole Yard Saves Snow Digging

Snow shoveling to dig out poles is eliminated for line crews of the Puget Sound Power & Light Co. by standing poles on end as illustrated at the Nason Creek patrol cabin near Stevens Pass, Wash. The poles are so guyed and snubbed together that individual poles can be singled out and lowered without dropping the whole stack. The idea is that of Sig Freestad, division of power supply inspector and local manager for the company at Skykomish.

The yard is part of the patrol line equipment for maintaining the Rock Island-Beverly 110-kv transmission line over the Cascade Mountains. Before conceiving the idea of standing the poles on end to keep them from being buried under as much as 20 ft of snow, Freestad had to take his line crew across Stevens Pass every week during the winter months to dig poles out of the deep snow.




Note
Service entrance must be rigidly secured and top not lower than top of service rack.
Art. 230, Sec. 2337
Note
Service mast must be mounted on side nearest distribution pole. Can be located near rear corner if clear path exists between post and utility pole. Service wires cannot overhang roof.
WEATHER-HEAD
INSIDE DIM. TO FIT SNUG ON 2½" CONDUIT
F.S. SECTION THRU FLASHING COLLAR
U BOLTS
RACK BY SERVING AGENCY
2"CONDUIT
BRONZE FLASHING COLLAR
CAULK
SET SCREW
METAL FLASHING
ANCHOR STRAP #1
2"x6" BLOCK-EITHER SIDE OF RAFTER
SET SCREW
10'-0" TO GRADE (MIN.) ART. 230, SEC. 2329 NAT'L. ELECT. CODE SEC. 2323 CITY of PORTLAND CODE (1947) (SEE 1949 REVISION)
Serving agency will furnish
A. Meter
B. Service rack with U bolts
Customer must furnish and install the following:
A. Main switch box
B. Meter base
C. All conduit shown
D. Weather head
E. Anchor straps and lag screws
F. Bronze flashing collar
G. Metal flashing
H. All blocking shown
DOUBLE 2"x4" STUDS
ANCHOR STRAP #2
1/4"x3" LAG SCREWS
3/16"
3/16" SET SCREW
ANCHOR STRAP #2
METER
DOUBLE UP STUD
24" O/C MAX
4'-6" MAX. WITHOUT BRACING
2'-6" MIN
10'-0" to GRADE (MIN)
1¼" CONDUIT
2-2"x6" BETWEEN STUDS TO RECEIVE DOUBLED STUDS
STANDARD FLUSH TYPE BOX AND SOCKET COVER
BUILDING SURFACE MUST MUST NOT PROJECT BEYOND FACE OF BOX
MAIN SWITCH BOX
6'-6" MAX to GRADE
5'-0" MIN
ART. 8 SEC. I - SERVICE AGENCY REQUIREMENTS
ENCLOSED METHOD
WEATHER HEAD
GUYS REQUIRED ONLY WHEN TOP OF MAST EXCEEDS 4'-6" ABOVE ROOF. 2 GUYS REQUIRED. USE 2 No 6 COPPERWELD GUY WIRES - 60° to 90° APART, SECURED TO RAFTERS
3/16"x1" GUY CLAMP
U BOLTS
2"CONDUIT
RACK BY SERVING AGENCY
GUY CLAMP
3/8" SCREWED EYE BOLT GALVANIZED
BRONZE FLASHING COLLAR
CAULK
SET SCREW
METAL FLASHING
BLOCK-BETWEEN RAFTERS NAIL TO EA RAFTER & PLATE
1/4"x3" LAG SCREWS
2 3/8"
3/16"x1"
3/16" SET SCREW
ANCHOR STRAP #1
24" O/C MIN
3/16" ANCHOR STRAPS (SEE DETAIL)
2"x4" BLOCK BETWEEN STUDS
Note
For brick veneer or concrete block use ½x3½" in lead sleeve expansion bolt in joins in place of lag screws.
BLOCK ON SIDING IF NECESSARY TO GET SOLID BEARING FOR ANCHOR STRAP
METER
SOCKET MUST NOT BE ENCLOSED & MUST BE PLUMB
L.B. FITTING
MAIN SWITCH BOX
6'-6" MAX to GRADE
5'-0" MIN
EXTERIOR METHOD
John N. Dubernat A.I.A. Architect 7/14/50
PACIFIC POWER and LIGHT COMPANY PORTLAND GENERAL ELECTRIC COMPANY

LOW-ROOF SERVICE STANDARD DECIDED

Hardly a meeting of electrical inspectors but the subject of services to low-roofed houses comes up. Architects and home owners do not like the mast sticking up above the roof and seek to do without it. But in order to get safe clearances from the ground for persons and vehicles, inspectors insist on minimums in the National Electrical Code, local ordinances or public utility commission rules. Contractors want to know definitely what they can install.

Recently the electrical department of Portland and the State of Oregon and the electric utilities and electrical contractors met and discussed and then settled on a standard. A suggested method of installation was then drawn and a sheet issued to contractors and architects. Altered only in larger lettering for easier reading the illustration above shows that standard.

With it a proposed amendment to the city electrical ordinance would require that a person making an installation consult the serving agency regarding the point of attachment; that the point of attachment be not less than 10 ft above sidewalks, 12 ft above garage driveways and 18 ft above other driveways, alleys or roads nor more than 30 ft. Then the amendment provides that, where the form of building will not permit such clearances, a suitable structure, capable of withstanding the tension of the service wire, must be provided.

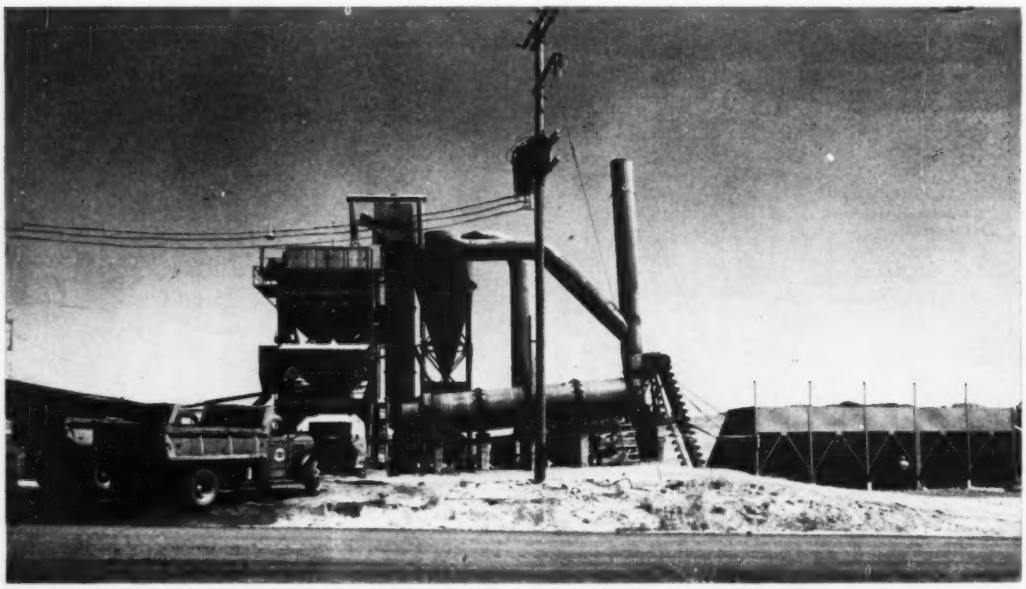
Lou Going, chief electrical inspector, has calculated that the strain on a service pipe like that illustrated above is considerable. Based on a 2,500 lb-per-sq-in. tensile strength for wrought iron pipe, and a safety factor of two, a 1¼-in. conduit, 1 ft high would withstand a 238-ft-lb bending moment; a 1½-in. conduit 342-ft-lb; a 2-in., 1,250-ft-lb. If it stood two feet above the roof, one half of the above would obtain the same bending moment. Using No. 4 aluminum service conductors for a 100-ft span to the service head, and allowing standard sag, and at a 60° outside temperature, the pull on the service pipe would be 71 lb per wire or 210 lb for a 3-wire service and it could be supported by a 1½-in pipe. But in winter, with ¼ in. of ice on the conductors, the pull could be as much as 415 lb per wire (which is a half of the breaking strength of the wire too). For that reason he recommends guying the service conduit and a minimum of 2-in conduit.

Tacoma has recently issued drawings for conduit service masts very similar to the above. The drawing shows attachment means to wood frame, brick veneer and concrete block walls but none for the conduit down between the walls.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Utilization Data Sheet No. 87

SUBJECT:	Electric Heating of Asphalt and Fuel Oil for Asphalt Plant
CUSTOMER:	Inland Asphalt Co., Spokane, Wash.
TYPE OF BUSINESS:	Asphalt Paving Plant
SERVICE COMPANY	Washington Water Power Co.
DATA SHEET PREPARED BY:	William A. Newman



Electrically heated asphalt plant for producing road paving mix. Off-peak heating gives a cost of only 6.02 mills per ton of mix

This plant has three 10,000-gal asphalt tanks and one 10,000-gal fuel oil tank, which are heated electrically. Paving mix is made by mixing hot asphalt with heated sand and gravel. The asphalt is maintained at 300° by electric heat and the sand and gravel are heated to 275° by firing with fuel oil heated electrically to 200°. Four 30-kw, 460-v NWH No. 6,301 Chromalox circulation heaters are used, one each on the three asphalt tanks and one on the fuel oil tank.

Heat is applied to the asphalt and the fuel oil by means of heat exchangers. Shell SAE 20 nondetergent oil with inhibitor added is used as the heat exchange medium. The heated oil is pumped through existing tank coils by two 5-hp positive-action gear pumps at the rate of 50 gpm. Model M Chromalox thermostats on the 10,000-gal tanks, flow switches, pressure switches, time clocks and time delay relays, complete the installation.

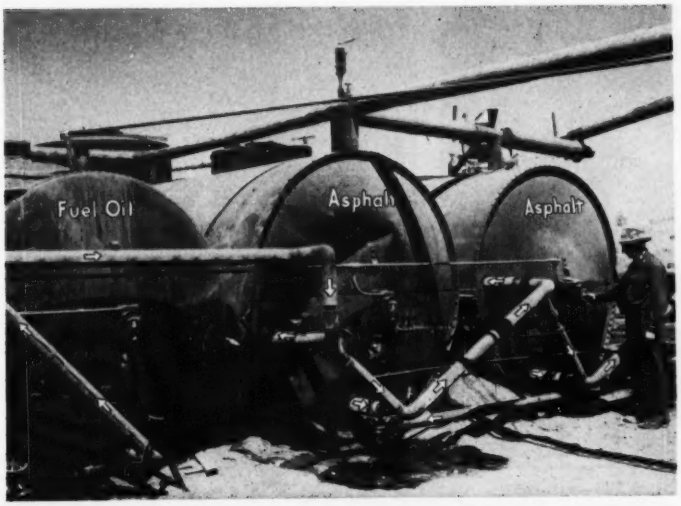
Advantages of Electric Heat

Electric heat has the advantages of constant uniform temperature, does not require additional help, is fully automatic, and effects a considerable saving over other methods. The customer decided to use electric heat in preference to the steam method used in most other plants of this kind because a better product is obtained. If a leak occurs in a steam-heated system, an emulsion is formed in the asphalt, which is most undesirable. Should a leak develop in the oil circulating method, it is of minor importance.

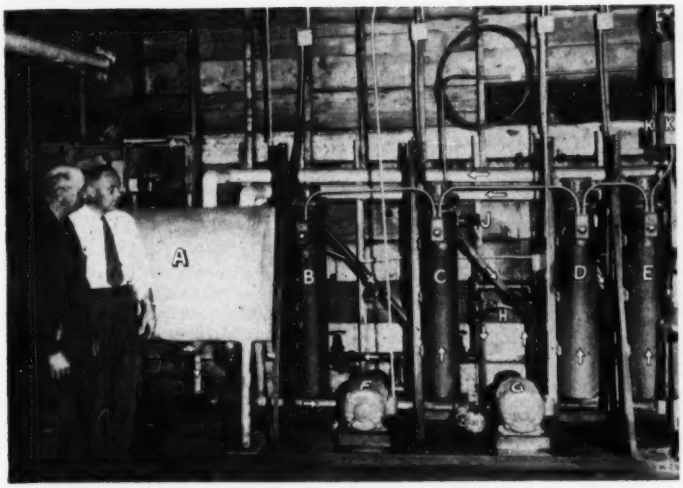
Electrical energy cost is kept to a minimum by off-peak operation so that normal plant demand is not affected. Total heating load does not occur over any length of time with sufficient wattage to raise the metered demand over 104 kw. The 104 kw is made up of 90 kw of heating and two 5-hp pumps. The 30-kw fuel oil heater does not go into operation at any time when the other 90 kw is on.

Operating Cost

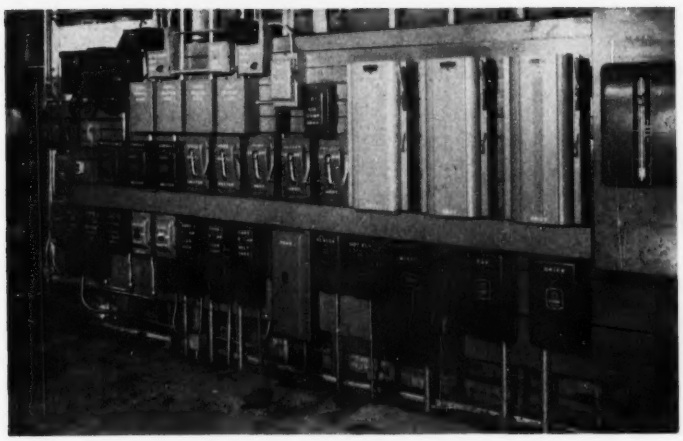
Monthly consumption is 26,720 kwh, which at 3 mills, the lowest step on the rate, makes the monthly bill $80.16. Cost of maintaining asphalt at 300° and fuel oil at 200° is 6.02 mills per ton of output. Peak output for a 9½-hour shift on one day in August 1951 was 1,029 tons of asphalt mix. Average monthly output at the plant on an 8-hour-day basis is 13,300 tons.



Two of the three asphalt tanks and the fuel oil tank are shown in the upper photograph. The fuel oil tank had not yet been insulated. Valves in the oil heater line are so arranged that all of the connected heating load can be directed to one asphalt tank to speed up recovery time, or all of the tanks can be heated in series



The center view shows the arrangement of heaters, pump and oil storage tank. A is the oil reservoir tank; B, the fuel oil heater; C, D and E, the asphalt tank heaters; F, the positive-action circulating pumps for the 10,000-gal fuel oil tank; and G is the circulating pump for the 10,000-gal asphalt tanks. Each circulation heater is protected by a thermostat that does not allow the temperature to exceed 450°. These thermostats have as yet not closed down the system because the circulating pumps take heat away from the heaters fast enough to keep the temperature down below the 450°. The flash point of the heat exchanger oil is 475°. To keep the temperature down in these heaters when the thermostats on the asphalt tanks kick off the heat, the pumps continue to operate for three minutes by the functioning of a time delay relay. When the system turns on, in order to be sure that the oil is circulating, a flow switch (H) has been installed in the line which, when pushed open, closes the relays on the heaters. Another safety factor added has been the pressure switch (J) which will automatically close down the system should the pressure exceed 150 lb. Time clocks (K) are used on this system and are set to allow the heating operation to function only after the plant proper has been shut down for the day



The lower picture shows the electrical panelboard, including time delay relays

New Crane Control

Crane controls so sensitive they can regulate the movement of a 250-ton load to within one thirty-second of an inch were tested recently at McNary Dam. Developed by Westinghouse Electric Corp., the new adjustable-voltage control has been installed on the first of two massive 200-ton gantry cranes. These will be used to raise and lower the 126-ton spillway gates at the dam.

The adjustable-voltage control embodies speed-torque characteristics that inherently cause the motor to slow down in both the hoisting and lowering cycle when the load is increased, without change in the setting of the control. The control monitors, or measures, the load on the motor and adjusts the speed accordingly, using a Rototrol regulator.

Oak Pit Barbecue

Ireland's

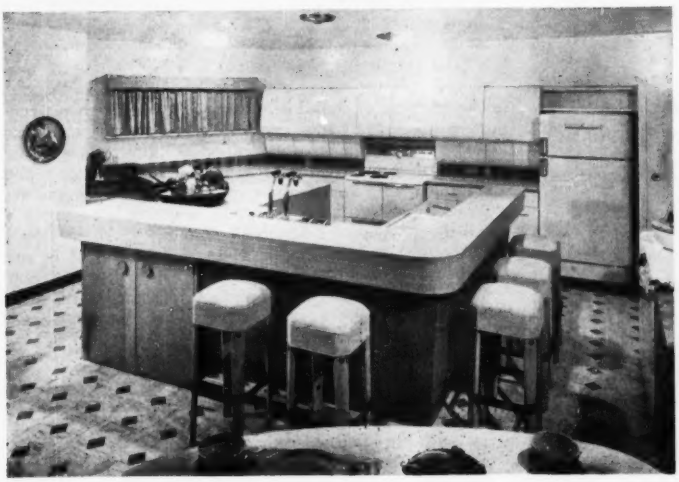
Multnomah Hotel

Infrared Cooks – Warms

Infrared applications in the food business are increasing. Foods are cooked as well as warmed by infrared. The Oak Pit Barbecue in Portland uses infrared lamps for keeping roasts warm in an appetizing window display. Lamps burn 15 hours a day. Ireland's Mart in Portland cooks its beef roasts in the window by infrared. Roasts of 70 lb are placed in the window at nine at night and are cooked by 10 the next morning. The Multnomah Hotel in Portland uses infrared lamps on its roast-beef cart to keep the meats warm. The Kopper Kettle at Bishop, Calif., has three lamps mounted over the pick-up counter to keep foods warm while waiting for the waitresses to pick them up

Kopper Kettle

Kopper Kettle



"New World" Model Home

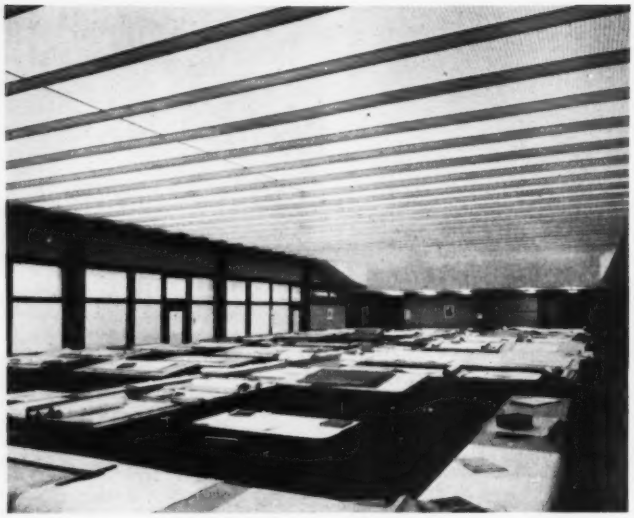
When the Associated Home Builders of Sacramento decided upon a model home to represent "the Home of Tomorrow," of course "it's electric." More than that, it incorporates some of General Electric's newest ideas in home electrification, even a few that are not yet on the market because of material shortages.

Perhaps the most striking idea in the Sacramento model home at Arden Oaks is the "soda fountain" type of kitchen arrangement, pictured here. A counter-covered center island is not only a serving counter but has the dishwasher and disposal-equipped sink in it, the automatic washer and dryer concealed under it, and even the ironer is stowed away underneath. This concentration of work area devices is unusual but is designed to save steps, as well as to provide a serving counter for snacks, lunch or breakfast.

First hand-made samples of G-E's new design for kitchen cabinets are used over the range and back working counter area. These cabinets have doors that open up instead of at the side. The door or lid of the upper cabinets lifts and is held up by counterbalancing springs. Under these are a row of smaller shelves in which to place appliances or other kitchen equipment. The doors to these drop down to the counter or, when closed, latch in place. The upper cabinets are lighted on the interior.

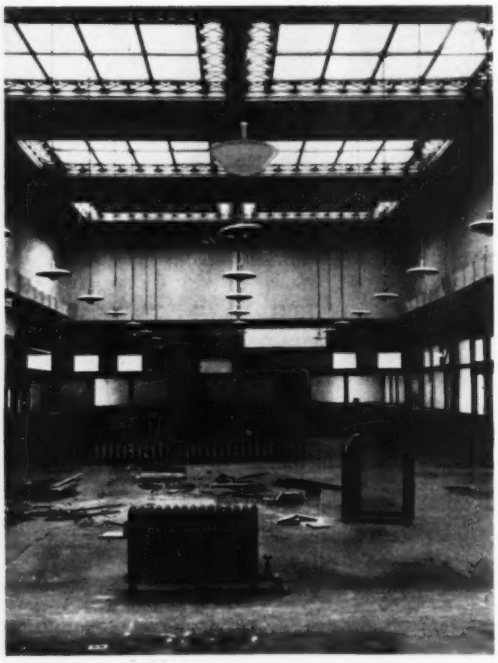
Lighting in this model home has been made to conform to the recipes for home lighting developed by G-E Lamp Department. Valance lighting over the windows in both the living room and bedrooms is supplemented by fixtures and floor and table lamps to give pleasing and yet ample illumination. Convenience of switching is made possible by the low-voltage relay switching system.

Those involved in the design and construction of the exceptional electrical and lighting system begin with the architect, Albert Dreyfus. R. A. Moore, Sacramento Municipal Utility District adequate wiring advisor, devised the wiring plans. J. P. Hobrecht, Hobrecht Lighting Fixture Co., collaborated on the fixture design. Mapes Electric Co. made the installation. G-E kitchen specialists and lighting engineers assisted wherever possible to do so.



Luminous ceiling with sound baffles (left) provides excellent lighting for drafting room. Right: Framework for luminous plastic panels

Luminous Ceiling Was the Answer



Making a purse out of a sow's ear was a problem with this old room. Engineers transformed it into a modern drafting room

What a luminous ceiling did to transform an old high-ceiling room into a modern well-lighted drafting room must be seen to be fully appreciated. The accompanying photographs attest to the remarkable transformation.

The problem confronting the Bechtel Corp., present owner and tenant of the building, was to convert the old room shown into a suitable drafting room for part of its engineering staff. The room was 96 ft long, 40 ft wide with skylights 25 ft above the floor. There were conspicuous air ducts, as may be seen, on each of the long walls and the room was generally in poor condition. Fortunately the underside of these air ducts was 13 ft from the floor, which made a good ceiling height for the new luminous ceiling planned.

Steel framework was erected to take 36-in.-wide corrugated plastic sheets made by Luminous Ceilings Inc. The problem of sound deadening where a luminous ceiling is employed has been solved by providing acoustical baffles or fins below the ceiling, as shown. These are hollow fins made of perforated thin sheets of steel and are filled with sound-absorbing Fiberglas. The fins are about 6 in. deep and 1 in. wide. The whole assembly is called an "Acousti-Luminous" ceiling.

Above the plastic ceiling 24 in. and spaced 24 in. are single rows of slimline units taking T-12 standard cool slimline lamps. Intensity at night was 80 f-c initial. With daylight coming through the skylights, intensity ranges up to 275 f-c on a bright day.

This design of lighting for the new drafting room was a happy solution to a difficult problem and the result was quite remarkable. Melvin G. Lewis, principal engineer for Bechtel's power division says, "Our new lighting, with the luminous ceiling, is as nearly perfect as any of our draftsmen has ever experienced."

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Price perspiration

Long-expected price regulation for the construction industry broke into print (fine) in mid-November; has the experts in translating gobbledygook sweating trying to figure it out so that an ordinary "wire-jerk" can understand it. A Trade Guide goes along with CPR-93 and is easier reading. Even the small contractor who works with the tools himself comes under it if he so much as has anyone hand him his tools. It means more bookwork and reporting whose costs cannot be added to the price.

Book users note

Pricing service users (such as Biddle Trade Bureau or A. E. Rowe Co.) will also have to do some arithmetic. There is some question that the new price regulation violates the Herlong amendment because it reduces the margin percentage from that of the base period. Book users will have to take the suggested price in the book, deduct the percentage used in that book to arrive back at the cost, then compute back on to that cost their own particular percentage. They will find it reduces their margin from 40% to about 37% on materials. Price services may not change their sheets at present. It would cost so much and Congress may change it all or the Herlong rule may be applied later, so they will put out instruction sheets to apply to their book prices.

Labor sheets out

Labor pricing is still more complex. The pricing services consider taking the labor guide sheets out of their books because they will no longer be usable. Few contractors were charging the full amount the wage scales and a reasonable percentage justified—they hadn't the heart to sock their time-and-material customers that much, so absorbed some of the load. Now they are stuck with that charge as a base and can only add the actual wage increase and a small "pay roll cost."

A sample

As an example, if the scale for journeymen electricians was $2.50 an hour during the base period—now June 24, 1950—the price charged for labor should have been $4.15 if overhead and profit were average. But suppose the contractor did not feel he could charge his good customers that much, so kept to the $4 he charged before. He is stuck with that as his price. Since 1950 the wage went up 25c to $2.75. All he can charge is that 25c plus a pay roll cost of 3c or a total of $4.28 instead of the $4.60 which his legitimate percentage would bring.

Retail sales

Pricing for over-the-counter sales of wire and materials at retail and by the self-employed contractor can follow the price guide. NPA has issued an order M-89 to enable retailers to maintain reasonable stocks of wire and other controlled materials for resale to the general public for personal, household and farm use. It does not apply to installers of appliances or TV or to rebuilding of damaged articles.

Keep in line

Materials for construction are under an ever-tightening squeeze, with no relief in sight until late 1952. NPA advised applicants for allotments of controlled materials for the second and third quarters of 1952 to file CMP-4C forms before Dec. 15, 1951. Those who were not given allotments for the first quarter were told to reapply later. About 65% of the construction applications are being turned down.

Special cases

To relieve special cases NPA during the past month issued several orders. NPA Reg. 6, is to clear quotas, ratings, etc., when transferred from one person or business to another, transfers of business, etc. Direction 2 to M-11 is designed to smooth the flow of copper by directing producers how to accept or reject orders and notify purchasers. NPA Notice 1 was amended to prevent hoarding or accumulating in excess of reasonable demands of business, personal or home consumption, or buying at over-market prices of scarce materials.

Used sales

Used motors and generators, control equipment, panels, etc., come under CPR-67. CPR-80 applies to used machine tools. CPR-67 provides two classes of reselling—from the manufacturer's list price, or from a net cost during the base period, with a percentage markup.

Inflation pressure

Feelers for another round of wage increases have been put out and talks are on the polite sparring level so far. Leaders seem to be waiting for a break in the ceiling, come the first of the year, possibly led by steel. Contractors are caught in a paradoxical bind. There is a shortage of men for big defense jobs but no work in sight for the run-of-mill business. Granting premium wages for big jobs to get manpower sets an artificially high scale for ordinary work. . . . Idaho Falls contractors settled with local 449 for $2.40 an hour beginning Feb. 1. Scale now is $2.36½.

Prospect for '52

Construction volume for 1952 may be 10% below 1951, some qualified estimates say. Residential building nearly touched the 1,000,000 unit mark in 1951 despite efforts to set it at 850,000. Except in critical defense areas house building in '52 may be down 15%. Among the 55 areas designated as those to get help in credit and materials for building 1,000 units each were these Western areas: Arco, Blackfoot and Idaho Falls, Idaho; San Diego, Oceanside, Calif.; Colorado Springs, Colo.; Las Cruces, N.M.; Solano County, Calif.; Camp Cook-Camp Roberts, Calif.; Tooele, Utah; Imperial County, Calif.; Bremerton, Wash.; Barstow, Calif.; Alamagordo, N.M.; Hanford-Kennewick-Pasco, Wash.; and Lancaster, Calif.

Makes good

Al Nicoll, former San Franciscan, now president of Graybar, was honored on the occasion of his 40th anniversary with that company. He started in S.F. as a sales record clerk in 1911, went East as assistant to the president in 1939, was made president in 1942.

Light dates

Dates for the IES regional conferences have been set—South Pacific Coast regional conference, March 13-14, Sir Francis Drake Hotel, San Francisco; Pacific Northwest regional conference, March 20-21, Empress Hotel, Victoria, B.C.

Safe and hot

Thermwire is a new flexible electric heating cable introduced by Edwin L. Wiegand Co. It's a heavy-gage nickel-chromium resistor wire encased in a tough insulation. It is designed for use on roofs, in gutters, downspouts to prevent icing, or in asphalt or concrete to melt ice and snow, to prevent pipes from freezing, soil heating. Made up in 80-ft, 400-w, 115-v and 160-ft, 800-w, 230-v sets with 10-ft nonheating lead and plug. A thermostat is an optional feature.

Panic preventer

Exide now has a portable emergency lighting unit called Lightguard that can be plugged in. A trickle charger keeps the battery charged. On power failure the lamp, a sealed-beam 6-v unit, goes on automatically.

Save zinc

Aluminum outlet bodies have been approved for all government jobs under a change in the federal specifications, if they carry UL approval, Killark announces, saying its Alumalloy fittings comply.

Strength in union

Two well-known Oakland industrial electrical contracting firms will merge Jan. 1. California Electric Co. will be joined by Vance Electric Co., according to Dan Bronson, president of California. Walter Vance Jr. and Jack Vance and Oak Adams will become directors and officers of the enlarged California Electric and the entire staffs and shop facilities of both added together.

Home study

National Industrial Service Assn. has adopted a standard home study electric motor repairman's training course for employees of its 1,400 member shops. It was worked out jointly with International Correspondence Schools, has 37 units requiring 740 hours of study.

Tell which

Mercury lamps now have a more descriptive coding system, General Electric Lamp Division announces. The PAR-38 lamps will have SP for spot or FL for flood, and BL will designate black light, all will note wattage.

For the future

A new wiring promotional program will be launched by the Bureau of Home Appliances of San Diego County for contractors, manufacturers and distributors of wiring supplies, inspectors and utility personnel. It is fitted in with the Adequate Wiring and lighting activities of San Dego Gas & Electric Co. Carleton J. Bunce has been put in charge of this promotional program. The kickoff dinner at the House of Hospitality Auditorium in Balboa Park was scheduled for Dec. 5 evening.

Low boys

California Public Utilities Commission has just revised its order to clear up the service-drop requirements to low-roof premises.

Mitchell Dreiman Bramble

Frailey Romig Ogborn Stoner

Electric, Gas Men Discuss Joint Problems

Public relations, building and maintenance, priorities and materials control, credits and collections, tax accounting were some of the common problems considered by electric and gas men in a two-day joint conference of the PCEA Administrative Services Section and the PCGA Customer and General Accounting Section in San Francisco's Whitcomb Hotel, Nov. 1 and 2. Dexter Stoner, Coast Counties G&E, and R. F. Ogborn, So. Calif. Gas Co., were co-chairmen and H. L. Moore, So. Calif. Ed., was vice-chairman of the well-planned conference. Fruitfulness of these joint discussions was emphasized again, and a spring conference was set for April 17 and 18 in Los Angeles.

Business and Tax Outlook

Taxes and level of business activity will be high in 1952, people will have a lot of money to spend but will be saving more than they have been in recent years, it is probable that there will be no tax increase during the year. That is the way the situation looked to George W. Mitchell, vice-president of the Federal Reserve Bank of Chicago, as he talked to the group at luncheon Nov. 1. Many factors might affect this picture, however, he emphasized.

In answering the question, if taxes go higher, can business level go up, he said that prospective was needed. In 1939, gross production was $90 billion, of which federal taxes took more than 7% and other taxes more than 10%. In 1945, gross national production was $215 billion, federal taxes were $43 billion, or 20% of gross, and state and local taxes. $12 billion, or a little more than 5%. Since then we have had inflation, Korea, two internal revenue acts and an excess profits tax; state and local government taxes are mounting and spreading. Gross national production for 1951 will be approximately $325 billion, the federal tax about $61 billion and state and local taxes about $23 billion. The internal revenue act of 1951 will not have its full impact until 1952, when it is likely that federal taxes will be between $69 and $73 billion and state and local taxes close to $25 billion. Gross production probably will increase 5-12% in 1952 and the tax bill probably will take 27½% of that amount.

According to Mitchell, critical points to watch next year are: (1) federal deficit and (2) consumer spending and saving. The tax bill seems to assure a balanced budget for fiscal but not calendar year 1952, he believes. There will have to be a lower level of federal spending, more taxes or inflationary borrowing.

Trying to create a tremendous capacity to produce equipment for war is like building a big plant, he said. Once it is built, cost of maintaining it at mobilization level will be less than building cost. Military spending probably will be higher in fiscal 1953 and into 1954, might peak up in fiscal '53. A $15-30 billion deficit seems likely, he said, but price level changes could alter the figure.

Factors against reduced military spending in calendar '52, he thinks, are: (1) military leaders have been given an assignment and will want the material to carry it out; (2) Congress has voted tremendous authorizations for the military; (3) very few will raise their voices for more butter and fewer guns.

On the other side he listed these factors: (1) quite a segment of the labor force has not yet been brought into production and there are no immediate plans for doing so; (2) hours of labor have changed very little since Korea; (3) there are very few multiple shifts; (4) the very nature of the preparedness program, the fact that we are creating instead of converting capacity, means that the urgency is not so great as it might be construed to be. All these, he said, were potent factors for arguing that rate of military spending might be slowed down to avoid deficit in calendar '52.

As to reduction in nondefense spending, Mitchell is afraid that it is not in the cards in sufficient amount. Inflationary borrowing is not likely, he believes, since Congress voted three taxes in a little over a year.

Stating that "your guess is as good as mine on tax increase in 1952," he said there was a good probability there would not be one. Much will depend on the spending pattern, he thinks. Before World War II, consumers had $70 billion to spend and saved a little less than 4% of that amount. During the war years the rate of saving increased to almost 25%. In 1949 rate of saving was 3½%; in 1950, 5%; at present, between 8 and 9%. Since consumers are saving about twice as much as in many of the postwar years, there is a little respite from the inflationary trend we felt a year ago, he pointed out, but how long people will save can only be guessed.

In 1952 it is likely that shortages will make it impossible for us to produce as much consumer durable goods as we have been doing. Whether peo-

ple will defer buying, he thinks, depends on whether or not they believe the emergency is ever going to be over. However, they have a good stock of durables now and he does not believe that they will divert to soft goods and services as they did during the last war. Therefore he feels that for '52 consumers will continue a relatively high percentage of saving.

Humanizing Letters

Humanizing one's self is the answer to humanizing letters, according to L. E. (Cy) Frailey of Columbus, Ohio, counselor in business writing. The formula is simple, as he tells it: Like people and simply talk to them. In that way, business letter writers can avoid the "whiskers" and "goozle" words that set barriers between the utility and its customers or suppliers. A "goozler," according to Frailey, is a writer who never uses a short word if he happens to know a long one with the same meaning.

Letters can build good will where there was none, he pointed out, and differences of opinion are easier to handle when a customer likes you. Many miss the chance to build good will by strict adherence to the "business is business" attitude, he said. There is nothing wrong with the philosophy of liking people, he reminded, and the first man who put it out lived 2,000 years ago.

One of the first suggestions he made for humanizing letters is to express appreciation. It is always possible to agree with something the customer has said, to show interest in his problems, or at least to add a tag line: "You know, Mrs. Smith, we very much appreciate having you as a customer." Another suggestion was use of the person's name rather than the wet blanket salutation, "Dear sir."

Be what you are, he urged, instead of falling back on such "whiskers" as "attached hereto"; "enclosed please find"; "wish to advise." And, he added, don't send the reader on a treasure hunt with the expression "under separate cover."

In conclusion he called for two attributes: RMA, right mental attitude (if you don't like people, you shouldn't be in business); and HT, human touch, "something more forceful than the atom bomb."

Building Design and Maintenance

K. A. Reeder, So. Calif. Ed., sponsor

Functional design of commercial offices and distribution centers, structural design of buildings and property maintenance were discussed by this new group, which concluded its meeting with a unanimous vote for a regular place on the program.

Honey Coates

Jones Reeder

Discussing the function of utility distribution operation centers in an illustrated talk, C. T. Schweitzer, So. Calif. Gas Co., emphasized the similarity between the layouts of the electric and gas bases. Each system provides modern office and assembly facilities, separate buildings for storage of large service trucks and smaller vehicles, supplies and equipment and truck loading docks being located in a central position between offices and garages. Adequate shops and utility buildings are provided for servicing and minor repairing of vehicles, transformers, meters and other equipment. Storage facilities for pipe, poles, conduit and construction materials vary according to necessity but are basically similar.

Asked the factors that determine size and location of centers, Schweitzer said that in his organization the choice is based on density of meter installations and that the company has standardized on two sizes with a definite number of crews per location. The Edison company is divided into districts conforming to population centers and the size of the installation is varied to suit present and anticipated growth within each geographical district.

E. B. Kruger, So. Calif. Ed., showed with slides and diagrams the method of determining the size office required and the more or less standard floor plan developed by his company. He also showed slides of interior and exterior architectural features. Kruger showed a graph that indicated a direct ratio between the number of meter installations within a district and the required floor space. This chart indicated that offices handling 25,000 or more meters require about 170 sq ft per 1,000 meters, while offices of less than 25,000 meters are somewhat variable with a mean of about 300 sq ft per 1,000 meters. The larger figure for smaller offices is caused by the large proportion of halls, closets, toilet rooms, etc., to actual working space, it was pointed out.

R. W. Dennis, So. Calif. Ed., was leader of a discussion of structural building design. At this session, F. Thomas Collins, consulting engineer of San Gabriel, discussed precast or tilt-up concrete building construction. Stating that, as in all masonry construction, the principal problem here is elimination of wall cracks, he described methods of joinery developed for this purpose. He stressed economy of precast over cast in place concrete; indicated that it is more economical than reinforced brick and in many cases has shown less cost than concrete block construction. Painting is a particular problem with tilt-up construction, he said, because the surfaces of the concrete are sprayed with a paraffin compound to break bond and this material tends to prevent adherence of the paint. Treatment of the surface by sandblasting is effective but costly, he pointed out. Use of a good sealer makes an effective base for paint, he said.

Priorities and Materials Control

J. O. Jones, PG and E, sponsor

That priorities restrictions will very likely be more stringent during the coming six to nine months was the consensus. It was urged, therefore, that utilities make the strongest possible showing of necessity on all future project applications and that applications be submitted as far in advance of construction requirements as possible to avoid delay in completion.

Inability to use allotments to secure controlled material in the quarter for

which allotments are issued was discussed at length. One suggested solution was that utilities request the DEPA to assist in locating the material as provided in DEPA Industry Letter No. 22. It was believed that a sufficient number of these appeals from companies would enable DEPA to present the seriousness of the situation to DPA.

Importance of properly rating orders and showing dates when material is required was stressed. Orders without proper ratings and delivery dates are subject to displacement by some of those that are complete when received by the manufacturer.

Differences of interpretation were discovered and resolved in the discussion of NPA and CMP orders and regulations.

Customer Activities

George S. Coates, So. Counties Gas, sponsor

Importance of shaping policies, practices and training to capture customer good will underlay all discussion by the customer activities group. No prepared papers were presented; each leader gave a short talk to set the stage, then called for general discussion.

Specific things that customers resent —the same things that utility men resent when they are customers— were brought out and ways of correcting some of them were suggested.

Bimonthly meter reading was reported by the companies practicing it to have had no detrimental effect on customer relations and sales so far as could be determined on a short-time basis. That the long-term verdict might be different was conceded.

Collection of bills by telephone is productive and well accepted by customers, according to the companies using that system extensively. It was pointed out that there is a rather heavy saturation of telephones in most areas and that saturation is not dependent upon the economic status of the residents. Necessity for careful selection and training of personnel for this work was stressed.

It was generally agreed that the collector, under present-day procedures, is not so necessary as in the past. Some companies have eliminated collectors entirely; others are using them for other duties as well. Custom and the availability of payment offices are factors, it was pointed out.

Whether or not a credit history file is worth the expense on individual residential accounts was a controversial subject. Availability of customer records and individual company policies seem to determine the matter.

Suggested methods of determining what customers think of utility policies, practices and personnel fell into two main groups: (1) large-scale programs such as surveys by outside agencies or public relations audits by company personnel on a continuing basis; (2) relatively simple things that any company can do either on a regular or intermittent basis. In the latter category were compiling and summarizing customer comments on all phases of company operation; questionnaires requesting answers in self-addressed, stamped return envelopes; telephone surveys on specific subjects; recording unsolicited comments secured during other surveys.

L. E. (Cy) Frailey lived up to his advance billing as an authority on modernization of business language and writing. He reviewed the letters and other forms used by some of the member companies and made suggestions for their improvement. That companies should be as natural in all their forms as they allow Reddy Kilowatt to be when he appears was one of his suggestions for avoiding stilted language and getting the human touch. Hedging, constant reference to "our records," use of such stalls as "at your earliest convenience" are some of the things to avoid, according to Frailey. He urged utility men to vary their pitches more, make their forms less commonplace in appearance, use pastel colors that do not offend. If there is some one in the organization who speaks naturally, let him write the forms, he advised.

Tax Accounting

O. A. Honey, So. Counties Gas, sponsor

All companies represented consider it necessary to maintain records for federal income tax purposes. These vary from simple reconciliations to formal tax subledgers, showing all accounts that were treated differently for regular accounting and for federal income tax purposes. One company prepared comparative records by years showing: (1) taxable income adjustments by revenue agent; (2) tax payable adjustments by revenue agent; (3) detail of taxable income, Schedule M—Adjustments and Revenue Agent's Adjustments. The last schedule was so arranged that differences in balance between books and income tax returns could be seen quickly and explained regardless of the number of adjustments over a period of years. It also served as a memory jog for working up the current year's return. Two companies said they considered it well worth while to employ one man full time for two or three years in the research work required to set up formal tax subledgers.

Most of the companies make monthly accruals for federal income tax liability based on monthly net income and including any large adjustments between net income for books and for tax return. Various methods, most of them tied in with depreciation rate differentials, create a tax liability credit slightly in excess of actual liability at the time of determination of federal income tax per the return. Attempts are made to create at least a partial reserve against additional assessments.

Although few, if any, companies are faced with any excess profits tax considering the higher normal and surtax rates for 1951, it was agreed that, should accruals be necessary in the future, they would be highly speculative until the annual net income could be computed closely.

In discussing the advantages and disadvantages of the composite reserve as compared with individual reserves, it was agreed that, if composite rates were used, it was still necessary to consider lives of individual asset groups. One of the great disadvantages of individual reserves brought out was the confusion that might arise in the transfer of individual assets from one functional group to another, which also necessitated transfer of a part of the reserve. In many cases, the only difference between the method used for the books and for federal income taxes is that the sinking-fund method is used for the former and the straight-line method for the return. Most of the companies represented have lengthening lives for their various assets as the companies continue to grow and to improve facilities.

One company stated that all recoveries of bad debts remitted by their operating divisions related these items to numbered lists on which such charge-offs were made. Through this numbering system no difficulty was experienced in determining the year these bad debts were charged off. Where extra work was involved to determine the dates of such charge-offs, most of the companies thought the small tax saving involved did not justify determining if recoveries included some nontaxable items.

All sales and some use taxes are added to specific items of capital by most of the companies. Property taxes on land that are a lien at time of purchase are capitalized and some companies capitalize the amount taxed against construction in progress at the assessment date.

Pay roll taxes are capitalized by various methods. One company on an

experience basis spreads such taxes as a percentage of labor; others capitalize a portion through overhead clearance. Some companies capitalize certain tax items on their books and deduct them as expense items for income tax purposes. For income tax depreciation, it is then necessary to deduct such capitalized tax items from depreciation base.

Preparation of reports and exhibits for use in informal conferences with the State Board of Equalization were discussed. The weight that should be given the different bases for assessment purposes, such as reproduction cost new, capitalized earnings, average value of stocks and bonds, etc., was discussed, but all agreed no set formula would fit all cases.

IES

Some little-considered aspects of color were given to the British Columbia Section, Illuminating Engineering Society, at a recent meeting by Dr. A. M. Crooker, professor of physics at the University of B. C. Dr. Crooker explained that color is "what you see" and is affected by incident light, by background which makes an effective contrast, and the spreading effect of mass. The Munsell and Oswald systems of classifying colors were explained. He made an analogy of them to an elevator shaft with white at the top and black at the bottom and, radiating from this shaft at different levels, imagined hallways leading to rooms painted differently so that all the various colors were included, on each level of hallway colors of the same reflectance. Harmonic color combinations, Dr. Crooker said, may be achieved by securing unity of expression that will impress and not distract. This can be accomplished by tinting secondary colors with the predominant one.

Answering questions from the floor, Dr. Crooker explained and illustrated the mixing of light and of pigments. In light the additive laws apply, while with paints subtractive laws apply with respect to the reflectance curve over the entire visible spectrum. The difference in mixing was also illustrated by showing how in mixing light the resultant reflective curve is the result of the addition of narrow rectangular functions; in paint the resultant reflective curve is a general function composed of individual curves covering the whole spectrum.

He also explained the various theories which try to account for the seeing of a complementary color when looking at a strong color, dealing particularly with the theory of afterimages. As to why warm colors are "approaching," he explained that this was caused by chromatic aberration of the lens of the eye. The different wave lengths of the different colors of light focus at different points on the retina and give the feeling of approaching or receding.

Northern California Chapter heard another aspect of color, that of black lighting as a dramatic advertising medium. Marcel Vogel, president, Vogel Luminescence Corp., San Francisco, gave a thorough-going talk on the phenomena of fluorescence and phosphorescence. He said that stabilized phosphors have now been developed in paints, lacquers, chalk, water-color tempera and in powders. He also said that the new developments in light sources produce ultraviolet radiation to extend the usefulness of luminescence in advertising, particularly in outdoor signs. Most interesting were his observations as to what had been learned in practice about the combining on signs of effects from luminescence and from visible light. He predicted wider applications in decorative interior treatment and even suggested experiments in creating a background for television viewing with a luminous wall behind the set.

Spokane Chapter heard John Keith give an interesting discussion of lighting for photography at its last meeting.

Oregon Section had a meeting on "Fluorescent Lamps and Their Proper Application," at which Walter Potter, General Electric Co. Lamp Division, and past chairman, gave the presentation Nov. 14.

EMEA

Robert E. Bomeisler, branch manager, RCA Service Co., and instructor in television courses at the University of California, was the speaker at the Nov. 15 meeting of Electrical Maintenance Engineers' Assn. of Northern California. Leo M. Kerkhof, Trumbull Electric Mfg. Co., was the speaker at a previous meeting.

Dates for the industrial electrical show and technical conference of Electrical Maintenance Engineers of Southern California have been set as March 20-22 at the Culver City Memorial Auditorium. Reservations for space are already being taken by the committee in charge of Richard Rogers. The EMEA postponed its annual fellowship smoker from Nov. 2 to Nov. 30 and held it at Palos Verdes Country Club. Speakers at the previous meetings included George T. Henderson, West Coast instrument engineer, Mines Safety Appliances Co., and William O. Kyte, manager, advertising and sales promotion, General Electric Co., Los Angeles, who presented the program "How Our Business Operates." It was bosses night, the members bringing their bosses to the meeting on that occasion. Members made a field trip to the Hyperion Activated Sludge Plant in Venice, recently completed there.

IAEI

Hawaii Chapter of International Association of Electrical Inspectors heard a report on the annual meeting of the Southwestern Section from E. L. Ralston Jr. who had attended the meeting. H. A. Gould gave a discussion on porcelain. Another meeting was scheduled for Dec. 12 in Honolulu.

Merl Mentzer, Rocky Mountain Electric League, has been appointed secretary-treasurer of the Rocky Mountain Chapter of IAEI. Victor Moulton, former secretary, has recently been transferred to New Mexico.

Met from all parts of the West at the NECA convention in Washington were those whose pictures were snapped for us by Hugh Scott of EC&M and Matt Sherwood of NECA. Adorning the facing page are: (1) Bill Varley, San Francisco association manager; Bill Welsh, Sacramento's; Ed Groggan, Stockton's; Ernie Kramm, Northern California's and Matt Sherwood, Western region NECA representative. (2) Tom Ford, Bay Boulevard, San Diego; Bud Jaggar, Jaggar-Sroufe Electric, Portland; Sid Hill, Hill Electric, Los Angeles; R. Goold, R. Goold & Son, Stockton. (3) Les Stewart, Maxwell's, Spokane; Electric Smith, Spokane; Sherwood and John Majerus, Puget Sound Chapter manager. (4) Will Pregill, Santa Barbara manager, and wife; Mrs. and J. S. Hurley, Hurley Electric, Santa Barbara. (5) Kramm again; G. Al Howarth, Utah-Idaho Chapter manager; W. R. Grasle, Portland; R. H. Taylor, Ace Electric, Portland. (6) George Schetky, Western Electrical Construction Co., Portland; Don Larson, Rocky Mt. Chapter manager; Mrs. and Morris Price, Reliable Electric, Denver. (7) At the registration desk, J. H. Caton, Buckles & Caton, Cheyenne; Past President Clyde L. Chamblin, California Electrical Construction Co., San Francisco. (8) A. J. Morroni, Electric Equipment & Eng. Co., Denver; Simon Halle, Colorado Springs. (9) Bob Rowe, Rowe Electric, Great Falls; Lawrence Rider, Denver Electric; Sam Hawkins, Denver. (10) Paul L. Briggs, Lighthouse Electric, Pullman; Bob Wilkinson, Spokane Chapter manager; and E. B. DeFeyter, Power City Electric

West Goes East

for NECA's 50th Anniversary Convention

McCambridge Plummer

Woodruff La Fortune

Goss Grayson

Richey Baxter

Stromee Frey

O'Brien Morris

CMUA Discusses Materials and Manpower

Development and utilization of manpower, materials and resources occupied the attention of the 19th annual conference of the California Municipal Utilities Assn. in Oakland Nov. 14-16. Papers presented before the 150 in attendance ranged from a report of the history and present development of the Central Valley project to a discussion of peacetime uses of atomic energy in the distant future.

Prominent among the imminent problems facing the group were materials for continued expansion to serve constantly growing loads. Merrill F. Woodruff, San Francisco office of National Production Authority, told them that conservation programs only can provide the solution for the problems posed by need for expansion and simultaneous restrictions on materials available. He summed up the requisites of such a program in four words—standardization, simplification, substitution and salvage.

Standardization, he said, breeds economy, and more efficient operation will surely result if only stocks of standard items need be purchased and stored. Simplification can start at the design level with genuine cooperation between those responsible for design and those who direct the mechanical stages of any contemplated project. Substitution requires initiative, resourcefulness and ingenuity, and considerable study should be given to revising requirements before materials become scarce. Salvage he termed the most important of the four, urging prompt disposal of every bit of scrap. Success in the mobilization effort and success in obtaining needed materials in the months to come will depend largely on the success of the scrap disposal program, he said.

R. P. O'Brien, chief of the Utilities Division of the Office of Civil Defense, State of California, said that in his discussions with utility operating organizations in the state the most frequently expressed fear is that emergency operations will be directed by those not qualified by training and experience to conduct a utility operation. He assured the group that this fear has been recognized, and steps have been taken to insure that emer-

gency operating directions and technical control will emanate from a well-qualified staff of experienced people who are currently in operating positions. Technical operation under emergency conditions will be under the direction and control of the utility organizations themselves, with coordination into civil defense activities through state and regional staffs.

A three-point program to utilize the best-known procedures for effective use of the human resources of an organization was presented in a paper by Luckmann-Tarnopol Associates. The program includes staff and line training combined with a scientific survey. The survey provides objective data about the organization as a basis for developing an efficient management team. The line supervisor is effectively trained in his job of handling the human resources. Training of men is delegated to the line supervisor, where it belongs, and he gradually takes over the complete job of continuous training. This establishes efficient two-way lines of communication within the organization. Final result is that the supervisors operate as a single management team of maximum efficiency.

In another aspect of utility administration and control, Frank Twohy, Los Angeles Department of Water & Power, said that the accountant has sufficient latitude under the present systems of accounts for utilities to make determinations that have a vital effect on the over-all financial and administrative situation of the organization. He urged that careful distinction be made between maintenance costs and costs which should be capitalized, since it is an easy matter to be so conservative that in time a rebuilt plant, which had as much or more remaining useful life as the original plant had when first constructed, will be written off and have no book value. This means that present customers have not only paid for the old plant, but for the new one as well, and future customers which it will serve will bear no share of its cost. He also urged careful distinction between indirect costs and other overhead costs. He recommended that supervision and equipment overheads be apportioned on an hourly basis, instead of on the basis of dollar accruals.

Speaking of California's water problem, State Engineer A. D. Edmonston said that whatever final plans are developed to take care of the problem as a whole it cannot be financed by any program on the order of two or three billions of dollars. As one example of the magnitude of the problem, he cited the proposed $1 billion plus Feather River project authorized for state construction by the last legislature. The project would involve storage and release of flood waters and pumping to areas in need of supplemental water supplies. Completion of the project would involve lifting water over the Tehachapi mountains into southern California, and discussion brought out that this would require more electric power than would be generated by the project. In a review of the conception and construction of the Central Valley project, A. B. Shaw Jr., assistant attorney general of California, showed that the present administration by the USBR is quite different from the original planning for the project. The bureau's present policy is that the United States intends to remain in the utility business in California permanently, to operate the main works of the project, and to collect through water charges the costs of operation and maintenance and in addition a component that will at some indefinite time retire the total construction cost of the main works. This without any permanent water rights being vested in the irrigation districts or land owners who pay the charges.

In a resume of the present status of atomic energy research, Dr. L. E. Reukema, University of California, said that application of atomic energy for industrial or central station uses was primarily a question of economics. High cost of raw material, complexity of equipment, and need for expensive safety precautions all make it uneconomical at the present time, he said, although atomic power plants generating in the order of hundreds of thousands of kilowatts probably will be in operation in the United States in the next ten years. This power will be actually a by-product of atomic piles that produce plutonium for government and industrial use, and to that extent will be subsidized. He pointed out that our large reserves of natural fuels, particularly coal, make atomic energy much less attractive to us than it is to other countries that have little or no fuel resources.

Newly elected officers of the association are C. E. Plummer, Modesto Irrigation District, president; L. W. Grayson, City of Glendale, vice-president; G. A. Baxter, City of Alameda, treasurer; and F. V. Frey, incumbent, secretary.

SAMA

Seattle Appliance & Music Assn. heard Phil Hamlin of Holerts speak on television problems in reaching depressed areas at a recent meeting, and had another meeting scheduled for Dec. 10.

AIEE

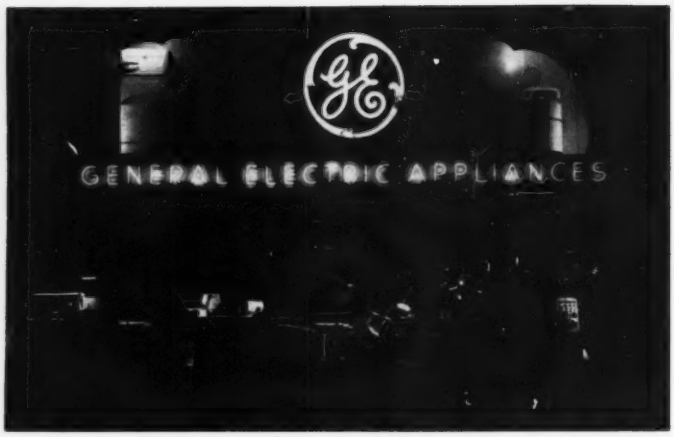
San Francisco Section heard R. R. Cowles, electrical engineer, Rogers Engineering Co., and formerly of Pacific Gas and Electric Co., speak on "Higher Secondary Voltage for Combined Light and Power Distribution" at its Nov. 27 meeting. He discussed the 480-v grounded neutral distribution system.

IRE

Dates for the eighth annual Pacific Electronic Exhibit at Long Beach municipal auditorium have been set for Aug. 27, 28 and 29, 1952, according to Heckert Parker, exhibit manager. The exhibit will be operated by an eight-man committee, representing the seventh region of IRE and the Los Angeles and San Francisco councils of the West Coast Electronics Manufacturers Assn.

Inspectors

The Electrical Inspectors Assn. of British Columbia held its third annual conference at Hotel Georgia, Vancouver, Nov. 2 and 3. L. E. Ryan, Vancouver city electrician, president of the association, presided. John C. Beckett, chief engineer, Wesix Electric Heater Co., San Francisco, discussed "Diversity Factors of Electric Space Heating." J. T. Langridge, electrical inspector, Electrical Energy Inspection Department of British Columbia, had a paper on "Some Problems with Respect to Industrial Reinspection." H. M. Schockley, apparatus division, Canadian General Electric Co., presented a paper on "Oil Circuit Breakers and Their Application." There was a demonstration of resuscitation methods by R. H. Elfstrom, B. C. Electric Co. D. J. Sanderson, chief electrical inspector, Vancouver, gave a paper on "Transformer Vaults." C. E. McRoberts, chief engineer, Amalgamated Electric Corp., Toronto, discussed "Industrial Power Distribution." D. D. Carpenter, secretary, Vancouver Section, IRE, spoke on "The Scope and Growth of Electronic Techniques in Industrial Applications." Speakers at the two luncheons were Thomas Ingledow, vice-president and chief engineer, B. C. Electric, and Howard Hume, vice-president, Hume and Rumble Ltd., Vancouver, electrical contractors. A visit to the Imperial Oil Co. refinery at Ioco was made on Saturday afternoon.



Fisher-Glassford Hardware in Fresno used actual appliances on its roof this summer

Fit Your Display to the Town

Bert K. Dart

President, Southeastern Utah Chapter, IEA

To display does not always mean "to attract." To display does not always mean "to sell." According to Webster, to display does mean, "to spread before the view," and believe me, about two-thirds of all electrical appliance dealers do just that. A beautiful electric range, the very latest in refrigeration, the only television receiver on the market that automatically blacks out all offensive commercials! But do Mr. and Mrs. John Q. Public realize this just because you have these things and, as Webster says, spread them before their view?

Absolutely not! You have a special story to tell and the type of display you use will tell how badly you wish to tell your story.

If you feel that proper displays of merchandise are too expensive, too much bother, too much wasted time, do this. When you return to your own individual places of business, empty your display windows. Leave them threadbare for one week. That, gentlemen, is a challenge. If you have the courage to do that, then and then only will I agree that displays are too expensive to use properly.

However, may I hasten to say that many of us in reality would be money ahead to leave our windows threadbare rather than to waste the effort and money to put in the ineffective displays that many of us do.

Today's electrical appliance business is highly competitive and customers go to the companies that seek them most intelligently and most aggressively. If my figures are correct, something like 85% of everything that comes to people each day comes to them through their eyes. Your display windows are the eyes of your store.

To begin with, your store windows do have to be inviting. They have to invite your prospective customers to come in, to browse around, to purchase.

As in any business, the merchandise should be displayed in a manner that will be most familiar in your prospect's own mind. Generally, that prospect is only going to buy one of each item.

If for example you have five or six refrigerators on display at once in a window, the customer becomes confused, thinks she has seen all of the features and doesn't bother to come into your store.

On the other hand, if you display one refrigerator along with one electric range, one electric sink, and perhaps one electric water heater in a novel kitchen arrangement, that prospect is going to see herself in a modern new kitchen. That prospect may easily become a satisfied customer, once that attractive window display has invited her into your store to see your other models, or even just to browse around, or most important, to purchase.

However, before you put that money in your cash register, keep in mind the fact that the displays inside your establishment contribute as much if not more than do your window displays to the final sale.

It is advisable to keep wide aisles between your merchandise and, particularly, to keep them spotlessly clean. Having a disorderly inside display does not pay off in dollars and cents but it does pay off in loss of customers and profit. Keep those inside displays in line with your windows. Keep them neat, attractive and ready for inspection by your customers.

To point out more strongly what displays can do and what they can mean, let's study the case of the most common electrical product used in America. It can be found in practically every home in this land. It is found out of doors in extremely large numbers. You use this item every day, both at work, at home, and probably at play. It comes in various colors, sizes, various styles and various shapes.

This one article is taken more for granted than any other electrical product—the all-wonderful electric lamp. Anyone who sells it would feel that such a product would not have to be displayed.

Are you different from any other customer? Do you generally walk into a store and ask if they sell electric lamps or do you, nine times out of ten, purchase them where you see them on display? Never underestimate what 12 sq ft of display space on your sales floor or even 12 sq in. of display space on your sales counter can mean if used to advantage.

Struggling with inexperience, working under abnormal conditions and lack of artistic skill make it difficult for many of the smaller dealers to put in really outstanding displays. Lack of money prevents some dealers from buying expensive materials. But for those small dealers, for those whose businesses are in rural areas, may I say this. It is not the cost of the display, it is not the unusual idea behind the display that counts. It is the eye appeal to your customer.

If your store is in a farming area, let small farm products be your props. Use something that is familiar to your own individual clientele. In this manner, it is easy to set the stage for a sale.

(Continued on Page 101)

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

December 1951

©

Newspapers revolt

You'd never know there was any shortage or about to be one from the big ad spreads shrieking appliance and TV bargains and trade-in deals at least in the city papers. It even has the newspapers alarmed and in Los Angeles the publishers have made some rules for advertisers to restrain their enthusiasm and check on their honesty before they'll accept the ads. Better Business Bureaus had also asked for prepublication censorship of TV and appliance copy. Failing in this they plan to prosecute at Federal and local levels.

Diverted to TV

In TV areas like Los Angeles and San Francisco white goods distributors feel TV is taking the family appliance money. They report good stocks of most white goods, and not much movement. Sales on the whole have been better last month than anytime during the year, and inventories in dealer hands are low again.

Glitter gone?

NPA has given the press reports that all fancy trim for de luxe models is out although no manufacturers have yet told dealers so. New aluminum evaporation vacuum process however uses no nickel or chrome, looks like it or gold, probably won't be curtailed. Plastics replace metals in many trim and gadget features. Trim seems to help sales, too.

Moves up

Harry Gerster, Los Angeles manager of General Electric Supply, is being advanced to vice-president for the Western Division, post once held by retired Dave Harris. He'll move to San Francisco and R. J. West from Dallas moves to L.A. as district manager.

Big show bigger

Believe it or not, but each year they get bigger--the annual Christmas appliance show of San Diego Bureau of Home Appliances, Nov. 23-28. Approximately 185,000 people poured through its four big exhibit buildings in Balboa Park to see displays by 60 exhibitors. Dealers and distributors were enthusiastic, sales were high, more makes and manufacturers participated. Most gracious show hostess ever was Florence Chadwick, San Diego girl who twice swam the English Channel. Show committee, headed by Ed Reed, G-E, consisted of Lee Bornstein, Bob Redfield, George Porter, Ed Nystrom, Ed Meise, Gene Kramer, did an outstanding job. J. Clark Chamberlain, Bureau manager and Lloyd Bouton, assistant show manager, feel it was most successful of 14 shows since 1933. Plans are already under way for the Spring Show, April 15, one building of which will be a commercial, industrial and residential wiring show sponsored by the wiring promotion section membership. . Bureau's electronics division technical subcommittee is preparing a flat maximum price schedule for TV

and radio repair service.

Troubles and taxes

What with excise tax changes and the new OPS pricing rules with a Dec. 19 filing date, the price situation in appliances is snafu but good. It isn't helped any by the price cutting and discounting done lately to unload inventory. CPR-22 covers most appliances, but industry advisory committees of phonograph records, refrigerators and freezers, domestic cooking appliances, etc., have met with OPA and asked for tailored-to-fit regulations for each. OPS has not set the date ahead as they requested, but will try to tailor a regulation later. Meanwhile amendment 32 to CPR-22 allows passing on the exact amount of excise tax, but only on those bought which carried the tax, leaving some appliances for sale at a lower price than exact duplicates.

Market dates

Market showings in January and early February include: California Gift Show, Los Angeles Biltmore, Jan. 20-25; California Lamp & Picture Show, same place, Jan. 27-30; Los Angeles Furniture Market, Jan. 28-Feb. 1; San Francisco Western Winter Market, Merchandise Mart, Feb. 4-8. A rival lamp show of the Lamp & Shade Institute is to be held at Shrine Auditorium, Los Angeles, Jan. 28-Feb. 1. Western Merchandise Exhibitors Assn. will have its Spring Gift Show in S.F. Civic Auditorium, Feb. 3-6. Seattle's show will be Feb. 17, Portland Feb. 24.

Heat is hit

Hottest electric space heater selling market, at Las Vegas, Nev., got a cooling off when Southern Nevada Power Co. announced it will not have any power for space heaters not in use before Dec. 1. About 7,500 houses there are heated electrically now, but the 1,500 new ones due for building in 1952 will have to use oil or gas. This company has had the highest domestic kwh per customer in the U.S., but must save its power for ranges and water heaters--and Las Vegas neon signs.

Know to sell

Want to know what farm families think of the retailers they buy from? NEMA, Curtis Publishing and Country Gentlemen surveyed 2,000 farm families and show the answers in a very frank booklet. Farmers think dealers and contractors should have better informed and trained people, make periodic checks of the equipment they've sold, run a better repair service, hold demonstrations, have information on the equipment, stock parts, show more interest in their customers.

Wire at retail

Retailers who sell some copper wire, nails and other copper and aluminum controlled materials to the general public are given a self-authorization Order M-89 by NPA. Previous orders allowed them to sell and make them subject to demand from holders of CMP orders, but this allows them to order to replenish their normal counter sales stock. It is not to be used for installation of appliances, though.

Moves made

General Electric moved its Seattle appliance service center from 211 James St. to 401 West Lake, North. . Ekco Products Co., makers of housewares, opened a new warehouse at Whittier, where later some manufacturing will be done too. . Kierulff & Co. will soon move its Motorola, Thor and Webster-Chicago lines to a new place in Westwood, Los Angeles, and the Olympic St. present house will be quarters for a new industrial electronics department. Landers, Frary & Clark moved its Los Angeles office to the Bendix Building, 1206 S. Maple from 2155 East 7th.

Portable

Plasti-Kote Inc. now eases the service man's life with a self-spray lacquer available in both black and white, with which to touch up refrigerators, washers and other appliances. Spray dries in 10 minutes.

TV briefs

A FCC broadcast chief said there'd be 80 new TV stations in smaller cities authorized before July of '52. . NPA thinks there are enough materials available to make 3½ to 4 million sets in '52 but RTMA estimates run from 3 to 5 million. With 80 new stations that won't be enough. Also there's no allocation for TV antennas. . NPA clamped the lid on color TV for the duration with Order M-90. It prohibits making sets or adaptors, but color tubes like Paramount's Lawrence tube can be made. There is no material for circuits for color. . David Sarnoff of RCA told a Stanford Research conference that RCA has invested $50 million in TV and it is beginning to pay. Stanford Research is developing with RCA and Technicolor a new three-color tube. . Bing Crosby's researchers, John T. Mullen and Wayne R. Johnson, have developed a working tape recording gadget that translates what it sees into magnetic waves on the tape for both sight and sound, without using a photographic process at all. And Ampex Electric Corp. of Redwood City says it is going to manufacture it. . A group in Palm Springs is trying to swing a deal to get microwave stations into that area for TV.

.. and business

TV set sales continue to boom and inventories are getting low as production rate has already been cut by material allocations, will get worse until summer of next year. . Capehart, suffering from a long strike, may not get any sets to Western dealers in time for Christmas. . Packard-Bell says it is already on back order, so does Hoffman, Kaye-Halbert and others. . Hoffman, weathering its fire loss and a big drop in year's volume, is getting back in the black. . Kaye-Halbert and Blackman Sales and Roberts Distributing of Missouri are snarled up in lawsuits over distribution contracts. Blackman meanwhile has lined up National Electronics, makers of Natalie Kalmus and Cinema brands, in a new distribution and servicing combination. . Set sales in Los Angeles area were well over 1,130,000 by Nov. 30. In San Francisco area over 255,000 sets are claimed by broadcasting stations.

.. sports

The Shrine East-West football game will be televised coast-to-coast on Dec. 29, from Kezar, San Francisco, sponsored by Motorola. . RTMA is vigorously working to promote more sportscasts as well as get dealer help to stimulate increased gate attendance.

.. licensing

Los Angeles County passed a $36 a year license fee on TV service shops in its unincorporated county area; L.A. City has a similar one on the fire. Electric League has fought to reduce the fee but is told it costs that much to maintain the bureaucracy. Pasadena is considering one too, with a bond and other holds to halt gyp installing and servicing. . RTMA is developing a TV technician training program for vocational schools to turn out more trained men. . Sylvania offers service men a neat little pocket plier set with orders of its tubes.

.. and distribution

Westinghouse Supply has appointed Ed Hanslip radio and TV sales manager for its Vernon merchandising branch, succeeding Gordon Wright. . CBS is concentrating on B&W set making to sell through its distribution chain. . Motorola has introduced its first big screen portables with 14, 17 and 20-in tubes as additions to its 1952 line, priced $199.95 to $399.95. . John Meck Industries Inc. and Scott Radio are now officially merged. . TeleKing Distributing Co. of L.A. opened a sales branch in San Diego at 11th and Market, with Robert Mosher heading it. . Capehart solves the "where to put it" problem with a corner cabinet TV set. . Emerson has added two table and one console model for 1952 with 17-in. tubes. It is playing up its "area engineering" field test program. . Wildest idea yet is Herbert Horn's Fashion Parade. Salesmen stripped to their shorts can earn clothes piece by piece in a big sales contest on 20-in. sets.

Free-Westinghouse is introducing the Challenger, a new low-cost top-quality sewing machine to sell for $99.95. It is a full size, rotary, gear-drive portable. Also has it in console and desk style models. . Wesix has placed on the market its air heaters and Ionic devices, either in combination or separately. The Ionic makes extra ions in the air which is beneficial to some sinus sufferers. . A new maker of steel kitchen cabinets is Columbia Kitchens, a division of Supermatic Products Corp. of Burbank, Calif. . Sub-Zero Ten-Ten combines in a two-door cabinet a 10 ft freezer (upright) and a 10 ft refrigerator. Walter B. Lloyd Co. distributes it in the intermountain area. Lloyd B. Sutton is the Manitowoc Equipments Wks. representative, maker of the Sub-Zero line, in S.F. Merchandise Mart. . Frigidaire now has a revolutionary ice cube maker for commercial use. It freezes the ice in slabs and cuts it into cubes with electrically heated wires. Capacity is 5,000 cubes in 24 hours.

New in the field

Mitchell Mfg. Co. says its 1952 line of room air conditioners will muffle the sound by a new fan arrangement and remove one of the main objections to such units. Held a big meeting of all its reps at Chicago, early in November to show them its full lines of air conditioners, lamps and lighting fixtures.

Noise hush

Don't be surprised to find all new lamp bulbs coming out with aluminum screw bases. General Electric has announced this change for many of its incandescent lamps. Tried it on flash lamps last year. . Miniature lamps are coming in a new 10-lamp carton about the size of a lady's compact. . Monowatt has a package of two night lights that ought to be a popular gift item. One has a blue shade and blue bulb, the other is ivory. Retails at $1.10.

Lamp these

Norco Products Mfg. Co. offers a line of Blacklight Chalk that glows brilliantly when activated by black light. Is easily erased.

Glow

General Cement has three service gimmicks that are news--a Tenna-Klip for service men to affix antennas quickly to sets without loosening screws; a duplex tube pin straightener; and a TV picture tube extension cord either for use during servicing a set or for custom mounting the tube away from the set.

TV gimmicks

General Electric is expected to show four new refrigerators to a national distributors meeting this month and to local meetings in January. Some increases in prices expected as G-E has asked OPS for such raises.

New year models

A new remote reading freezer thermometer has been offered by Airguide, Fee & Stemwedel Inc. of Chicago. It can be mounted outside the freezer at eye level or any nearby location. Tube does not prevent tight lid.

Outside reading

Some of the "ungood" news included: Jail terms and fines were given an association of plumbers and appliance dealers, the plumbers union business agent and individuals in Las Vegas, Nev., for violation of the Sherman antitrust act. They were charged with using a common estimator and controlling who received jobs in installation of washers, etc. . Sun Vacuum Stores, operating in Los Angeles, San Francisco, Fresno and other cities, filed in bankruptcy. . Crosley cancelled the franchise of three Los Angeles stores of the May Co. . Manager of a large Los Angeles housewares store, Parmelee-Dohrmann's, was charged with theft of funds from the store.

Shadows

Boyd Distributing Co. of Denver has been appointed distributor for the ABC line of laundry equipment.

New line

If you live in an industrial area, point out to your customers how electricity helps that industry and what in turn that industry contributes to the manufacture of a particular item on display. How copper is used for wiring, how steel is used for frames and cabinets, how coal is used in processing steel and things of that nature.

If you live in the city, appeal to customers through their most precious medium—time. Prove to them that they can save time by using newer, more modern electrical appliances.

In our business we must keep in mind one very important fact—especially important in these times of high prices and sometimes low quality. Your store is only one of many that will be visited before purchase is made. Today, those people who are looking for a TV receiver, a freezer, refrigerator, range or any other article involving a considerable investment are going to be certain that that article is the best investment for the price.

May I say most emphatically: To display *properly* does mean to *attract*, to display *properly* does mean to *sell*.

Home Equipment Workshops

Demonstration techniques are being shown at home equipment workshops sponsored by the California Home Economics Assn. in the area served by Pacific Gas and Electric Co. Marguerite Fenner, PG and E home economics director, is heading the activity.

Home economists with manufacturers, distributors and the utility are participating in the program, which includes demonstrations and talks on the automatic washer and dryer; ironing techniques; utensils and their effect; use and care of the range; round-the-clock with the home freezer. In the Bay Area, where the workshop lasted two days, there were added the why's and how's of giving a demonstration; how to demonstrate two-temperature refrigerators, dishwashers and waste disposers; do's and don'ts of TV interviews, cooking and demonstrations.

Teachers attending the all-day Saturday meetings receive institute credit. For the longer Bay Area workshop, teachers earned one unit of upper division college credit.

Workshops already held, with attendance figures: Sacramento, Oct. 6, 85; Bakersfield, Oct. 20, 120; Yuba City, Oct. 27, 55; Bay Area, Nov. 3, 175, Nov. 10, 155; Fresno, Nov. 20, 135. A Stockton meeting is scheduled for Jan. 29.

Shoppers Find Salesmen Lax

After a week of appliance shopping and a survey of customers, the Dan E. Clark II and Associates research organization turned over to the Salt Lake *Tribune-Telegram* some findings on salesmanship that probably are not peculiar to Salt Lake City alone. They showed a pretty low score on sales aggressiveness, follow-through and even good impressiveness, despite a fine market potential, a high acceptance and substantial buying intentions.

Buying Habits Checked

K. C. Carpenter, national sales manager of the two newspapers, engaged the Clark research firm first to compile a survey of buying habits, expectations and public attitude toward the appliance dealers and salesmen. It was designed to help local dealers and distributors and their national sources of appliances to get better results from their advertising. The results were compiled in a 56-page booklet, "Appliances and the Men Who Sell Them." The public attitude discovered in making the survey led to a second project —the shopping of the stores for a week by a group of ladies in their twenties, thirties and forties, who visited half of the city's appliance stores in the guise of potential customers. The results of this was put up in a little pamphlet, "A Week of Appliance Shopping."

"From your experience with local appliance dealers," the researchers at the homes asked, "would you say they are doing a good job, a fair job or a poor job of handling and servicing their customers?" Of the total number queried, 62% thought dealers were fine, 13% only fair, 10% poor and 15% were undecided. It was found that only one in ten purchasers had been followed up after the sale to check up on how the installed appliances were functioning. Five out of ten had not received home demonstrations of products purchased.

In the shopping survey, made at all hours of the day to equalize sales pressures and fatigues, the shoppers, who strolled in to look at the appliances and look eager, reported that:

In 55% of all cases, salesmen did not even acknowledge their presence.

Clocking the salesmen, they found that, in 33% of all cases, they waited two full minutes before salesmen engaged them in conversation; in 11% of the cases, they waited three minutes.

Only 21% of salesmen bothered to take the names and addresses of prospective purchasers, only 10% sought permission to make home visits.

Fully 65% of the salesmen failed to offer trade-in appraisals; 67% did not explain store credit plans; 56% failed to flatly ask the shoppers to buy; 69% failed to offer their business cards; 13% failed to thank shoppers for dropping in.

Only 66% of all salesmen seemed genuinely interested in making a sale; 19% were "fairly interested," 15% "not very interested."

Thirty-six per cent of the shopping visits led the researchers to state they would not return to the same store and seek out the same salesman if making future purchases.

What was wrong with the salesman?

"He seemed to think he was doing me a favor," said one shopper. "I had to lead him from model to model, ask about features, he wouldn't volunteer information, was slightly impatient at questions I asked," said one shopper's card.

"Acted as if I was wasting his time, his mind was elsewhere."

"This salesman talked on the phone to a friend while I stood and waited. Didn't seem to know what he was doing. Couldn't explain much about features," were other shopper reactions.

Market Available

The market available to dealers, despite high saturations, was also emphasized in the survey, such as that 34% of the electric ranges were more than 10 years old and 5,217 housewives were thinking of buying a new one, etc. These figures and the other results of the survey are being taken to the appliance distributors in Salt Lake City by *Tribune-Telegram* men in small meetings of dealers and distributor salesmen. Slide and easel charts are used in the presentation. Tact is used in showing up the faults in salesmanship as not applying to those present. But the lesson is there for all to take home and improve their methods. It is pointed out that advertising can only bring customers to the sales floor. After that it is up to the salesman.

Just as the Salt Lake City survey was made on a sample basis, the entire survey, as a sample, may be taken as what can be found in any other city.

School and farm advisors—Von Jarrett, vocational agricultural teacher, Richfield High school; Parley Young, same for Monroe High; Fred Cornaby, vocational agricultural area supervisor for southern Utah; C. B. Crane, vo-ag teacher for Circleville High—being shown the wiring display board by S. Reed Nixon of the Telluride Power Co.

Dealers Not Doing Right By the Farm Market

S. Reed Nixon

Assistant Sales Manager
Telluride Power Co., Richfield, Utah

Many top electrical men have expressed the opinion that our farms are going to represent our greatest source of expansion in the coming years. This I firmly believe.

American farmers have become mechanically minded. The farm equipment men have done an outstanding job of providing them with mechanical tools for field work. A tractor is an essential today. Combines, hay balers, etc., are becoming common even in places where 10 years ago it was generally thought these tools were not economical, were even unworkable.

Since the farmer has become mechanically minded, the next step is to create in the farmer's mind a desire for electrical drives to power many of these machines. That is our job—to create the desire. Sell him, in other words, on electricity for his farm hired hand.

Farm homes generally are on a par with urban homes electrically and in many cases are ahead. So let us turn our attention to the farm industry phase. Herein lies the great field for expansion. This phase in most cases has been sadly neglected.

About a year and a half ago I was assigned to work in the sales department of our company, and we began a rural program with big aims and ambitions. Naturally all we expected to have to do was tell the farmers about electrical farm equipment. *Selling* them was not thought necessary.

Our first step was to become familiar with the farmer and his equipment and determine the extent of his electrification. This called for personal contact work. I remember the reactions I received the first day. They ran all the way from complaint and grumbling to sincere appreciation.

Yet I believe we accomplished a great deal that day with public relations. One farmer said that it was the first visit in five years except from meter readers.

It was soon apparent that, if any progress was to be made, individual contacting would have to give place to group contacting. Since our company is essentially rural and the majority of our customers are farmers one way or another, there was so much to be accomplished we would have had to hire too many rural contact men to do the job. Yet the job had to be done.

Perhaps the most important thing we found was that the greatest bottleneck to future growth in the farm industry was poor wiring. Most of the complaints could be traced to poor or inadequate wiring on the farmstead. This was mainly because of the farmers' lack of understanding of electric power and wiring devices.

I found that nearly every farmer with more than a couple of cows had a milker, but very few had it connected to 240 v. Three-wire service to the dairy barn was rare. Milk coolers and water heaters in Grade A barns had been added on wiring meant only to carry lights, and small ones at that.

I recall one place in particular where the dairy barn had been wired with extension cord, probably No. 18 or No. 20, to which was attached a 1,000-w water heater of the pour-in type, a ⅓-hp milk cooler and, on a 150-ft extension to the extension cord, a ½-hp milker. The voltage drop was terrible.

When the milker was on the cooler would not start. When the water heater was on nothing would work. Of course everything was connected 120 v.

The farmer was very sympathetic to my urgings to correct this condition. I warned that his motors were in danger of burning up. He promised to do something.

The next visit I made was a few months later and he had a sad story to tell. The capacitor on his milk cooler motor had burned out and he had been unable to find another for four weeks. In the meantime he hauled ice from the river to put into a $600 cooler to cool his milk!

While the farmer suffered the greater loss, we also lost revenue from an idle milk cooler. Now this equipment had been installed by a local dealer. He should never have allowed such a condition to exist. He lost a customer.

I found that very few devices were grounded, resulting in hazardous conditions. One farmer had a calf stall made of welded metal pipe. Connected to this pipe was another metal pipe, which served as an air feeder to operate his milkers. A high resistance fault had occurred in the milker motor.

The potential to ground was not high enough to be felt by the farmer, but every time the calf touched its nose to the metal rail, it would collapse. After noticing this strange behavior, he called it to the attention of

an electrician friend, who immediately recognized the trouble and corrected it.

I found that unsafe switches were being used. When I called one farmer's attention to the hazards of an open-blade switchblock for a milker switch, he told me a neighbor had recommended that he remove the enclosed safety switch already installed and use this "Jim Dandy" open blade. The neighbor had a few extras he'd be glad to sell.

The farmer could not understand why, when on dark mornings he would feel around for the switch, he always got a shock. Of course there was one advantage. He always knew when he had found the switch.

These farmers wanted to learn why the dealers hadn't told or advised them. Perhaps the dealers didn't know. I found many who didn't even know the rudiments of safe wiring. This of course injures the entire industry.

Well, there are many more examples I could cite; however, these serve to illustrate the great need for better farm wiring as a prelude to increasing farm load. This gratis assistance to the farmer in the way of advice will naturally lead to opportunities to sell farm equipment or at least recommend its use to a sympathetic farmer. Dealers as well as utility men must call back on customers.

Now to return to the former point of how to disseminate this knowledge. Since to visit each farmer was impractical at the present time, the only alternative was to get them together in groups. This would: (1) Give greater coverage per unit of time. (2) Find out who most urgently needed help. (3) Create goodwill among leaders of agriculture, county agents, agricultural teachers, etc. (4) Work with a group desiring to better their knowledge. (5) Learn what their problems are, and (6) Teach them about the power companies.

We decided against the idea of calling our own meetings as this would be a project all its own. It was easier to go to already organized groups and ask to participate in their meetings.

We adapted to our needs a series of lessons published by the Pennsylvania State College on wiring and got one of the high school shops to build us a wiring demonstration board. In this series we explained and *demonstrated* the advantages of large wire and 240-v connections, simple electrical terms and any other questions that might come up in the group. We also covered thoroughly the subject of grounding.

This series was first presented to all agriculture teachers, shop instructors and veteran trainers in our territory with great success. They seemed very much interested. Then we told them they could have any part of the series to present to their groups—particularly adult groups such as young farmers and veteran trainees.

We were very successful with this and are still carrying on this program. After each meeting we discuss with the men any question vital to the power industry. Those who have particular problems on their farms are visited first. The aid of the leader is enlisted and where possible he accompanies us on our visits.

To each person who attends the classes we send *Electricity on the Farm*, an excellent monthly magazine that keeps farmers in touch with the latest in electrical devices, and also gives us a talking point when visiting them.

This has been our beginning. We now occasionally have farmers requesting information. The farm market is a growing one. The electrical industry has turned a great deal of its attention to developing new appliances and devices. The surface has only been scratched.

Conservative estimates are that a farmer should use not less than 5,000 kwh a year. We fall way below that now. Ours is a great future; there is much to be done and quickly. For what we leave undone the social planners soon step in and do for us—at our expense. Remember agriculture is the aim of socialists. We must get there first with the most help.

When Others Are Wailing, Keep Working

Ken Hampton
Valley Electric Supply Co.

Action now, when sales are slow, will pay off for retailers.

Let the other fellow wonder, talk and argue about why times are slow, while you act—and your business will keep making a profit.

Keep up the fight for business each day and each hour of the day.

Plan each day's work a little better and inspire your organization to work a little harder and things will come your way.

When things are tough, dig in and do the things you can do without additional expense.

Do the details a bit better and run the business a bit better and you will get results and be proud of your store.

Here are some suggestions:

1. Hold an open house for your friends and customers. Show them both your store and merchandise.

2. Change your windows each week. Also, in addition to the appliance and its price, write a list of all the reasons your customers should own the appliance shown. Put that list of reasons in the window.

3. Have each employee call five or more friends or former customers each day and ask them to buy something you sell.

4. Invite the local newspaper and radio station men to come to see your business and make suggestions. This will keep them interested and boosting your business as well as give you valuable suggestions.

5. Go out and see people. Go call on former customers. Call on the local people you buy from and ask them to come and buy from your store. Go see people because people make business.

6. Get all your organization together and have them make suggestions. Then have them help put the best suggestions in effect.

7. Keep everybody in your organization busy. Busy people create interest and by their activity create enthusiasm with customers and fellow employees.

Here are some ways to keep busy:

1. Rearrange the merchandise in your store.

2. Do any needed minor repairs.

3. Repaint or touch up where needed.

4. Be sure all merchandise has price tags on and that price lists and catalogs are up-to-date and in order.

5. Train, train and train yourself and employees in product information and sales presentations. (Let employees team up and train each other.)

6. Change show windows often.

7. Do sales canvassing by telephone.

8. Send out direct mail to prospects and customers.

Invite home economics teachers and their classes to visit your stores. Their discussions at school and in their homes will help build your store.

Know Your Electric Range, a classroom textbook, has been prepared by Pacific Gas and Electric Co. at the request of home economics supervisors. It is intended for use by junior and senior high school students and some colleges have requested it for use in teacher training. Text is sixth-grade reading level and, upon recommendation of school authorities, 18-point type was used. Thirty copies are being made available, free of charge, to each home economics foods teacher in PG and E territory.

ELECTRICAL WEST

Are Steam Plants Needed ?

CONSTRUCTION of federally financed steam plants in the Pacific Northwest will be one of the controversial issues to be decided by the second session of the 82d Congress which convenes in January. Vagaries of weather and water flow during recent months have raised grave doubts as to the over-all dependability of Columbia River hydro power. As a remedy Bonneville Power Administration and the U. S. Bureau of Reclamation now propose that Congress appropriate large sums for 400,000 kw of steam plants to firm up this hydro.

Congressional approval of this program might well set a precedent which would firmly establish the Department of Interior and the USBR as operators of completely integrated electric utility systems rather than marketers of by-product hydro power. Consequently before the first dollar is appropriated, Congress should demand an unprejudiced and complete study of the Northwest power situation — a study in which private and municipal utilities have equal voice with the federal power generating and marketing agencies.

The steam plant program involves many questions for which accurate and unprejudiced answers should be available to Congress. How much steam capacity is required? Where should the plants be located —adjacent to load centers to reduce transmission losses or at the ends of transmission lines? How much fuel will be needed and where will it be obtained? The region lacks natural gas; its coal resources are limited and poor in quality; fuel oil must be shipped into the area at considerable expense.

Of even greater importance is the question of steam versus additional hydro storage as a means of firming up the present undependable hydro capacity. A study might show that a more economical and more feasible program would be to provide additional headwater storage on the Columbia and its tributaries. Furthermore, the surplus hydro capacity for which steam stand-by is now proposed conceivably will be automatically firmed up when present upstream projects, notably Hungry Horse, are completed.

From the standpoint of present users of federal power the question of how the higher costs of steam-generated power would be distributed over the diversified customers of the Northwest power pool would be a matter of major moment. If an equitable distribution of such costs could be set up, conceivably the private and municipal utilities might construct and operate any steam plants which might be necessary. This would relieve the federal taxpayers of the investment burden of such plants.

These are but a few of the problems for which satisfactory answers should be developed before any federally financed steam plants are authorized for the Northwest. A joint study of the entire situation is indicated. Otherwise politics and ideology could confuse the issue to a point where economics and the specific needs of the region are completely overlooked.

Honor to Standards Advocate

"THE humorists sought to drown us in laughter over possible standardized women's hats. But in time we managed to sustain the conviction that we were wholly allergic to matters of style, for those vagaries were offsprings of joy, not of engineering. But we even helped to cheapen some hats by way of simplifying and standardizing parts in the milliners' machinery."

Thus quipped Herbert Hoover as he accepted the Howard Coonley Medal for his services to the voluntary standards movement, at a recent meeting of the American Standards Assn. He was cited for his work when he was Secretary of Commerce and led the early drive for simplification and standardization of whatever could reasonably be so treated to improve production and make more goods available to more people. The electrical industry in many groups worked with the then secretary and much of the rapid progress of this industry has been accelerated by the standards developed voluntarily.

EDITORIAL VIEWS

These include voltages, frequencies, turbine generators, lamp sockets, among many more. True, much more is possible in the way of simplification and standardization. The present material supply emergency will give further impetus to standardization perhaps of fewer wire types and sizes, on certain fittings and devices. The way toward such voluntary agreement among manufacturers has been pioneered by Herbert Hoover and those who sat in the early day conferences seeking these objectives.

The impressive thing about American standardization is that it has been voluntary and democratic in its process. Those knowing the most about the device or product themselves worked out the compromises to reach common agreement — it was not imposed upon them arbitrarily by government. The engineering mind of Hoover has always sought to correct and improve by going to the fundamentals, not trying vainly to change the end result artificially. Simplification and standardization of the parts that go to make up the machine is such a fundamental approach.

Misplaced Zeal for Testing

IN the past the West has led the country in seeking to protect the customer from shoddy or unsafe electrical appliances. The invasion of poorly made lamps, cord sets and table appliances from Japan before the war brought the need for sales control ordinances. San Francisco and Portland started them and "unsafe appliance" ordinances have been adopted in a great many cities, counties and a state or two. They were designed entirely with appliances in mind, not industrial or commercial equipment or wiring, for the National Electrical Code and ASA standards took care of that.

Thus far was fine, but unfortunately the zeal to regulate and police is intoxicating. Some cities seem ambitious to build up a local bureaucracy with their own testing laboratories and, to finance them, force all manner of devices into these shops for a local tag of approval. In some cases the type of equipment they require tagged is almost impossible to test in that way. No national standards have been developed by such a reputable authority as the ASA for them. Local standards at best are no better than a local opinion.

What this does is not to safeguard the public so much as to load the equipment with an additional burden of expense that must be passed on to the consumer in higher prices. The delays involved further increase the cost.

The great progress this industry has made in this country has been due to its standardization and simplifications that have brought the public mass production low costs. Such low costs have stimulated greater use by more people. In other countries where such standardization has not existed the complexity of voltages, frequencies, and equipment stifles progress in electrification.

To create a number of local "foreign states" where special and difficult extra conditions have to be complied with is reactionary. It will stifle electrical development and usage. It is a backward move, ill-suited to the progressive West. It is regulation gone to the head.

There is more danger to the people in making installations so expensive with added fees and taxes as to tempt the public to skimp and save and even evade such impositions. The energies of inspection departments would serve the public better if they did a more thorough job of seeing that the makeshifts the public puts in itself are safe and the materials good.

SECURITY is the myth of the Twentieth Century. It is the great chameleon that changes colors with the political tinges of its backers. It is the bread and circuses of Roman days brought back—by whatever group in power—to perpetuate itself. The promise of security has ruined every people it has touched.—Dr. W. D. Stratford, Dean of Men, Weber College.

THE MONTH IN BRIEF

Tacoma's Cowlitz Project Given License

Tacoma's Cowlitz River hydro project was given an FPC license at month-end. The fisheries problem, which threatened to block the development completely, will be ameliorated through $7 million of special fish-handling facilities, over which the FPC retains some jurisdiction. The project will consist of two plants — one housing three 75,000-kw units with provision for a fourth, and another embracing three 40,000-kw machines, with provision for an additional unit. Total cost is estimated at $135 million excluding facilities for handling salmon. Had the license been delayed much longer, completion of the plant would have been extended a full year because foundation work at the dam sites must be done during the winter low-water period.

Steam Energy for Interruptible Loads

Close to 40 million kwh of steam-generated energy were consumed by Northwest aluminum companies during the curtailment period last fall, according to D. L. Marlett, BPA assistant administrator. Total cost of the energy, including stand-by costs for plants kept in readiness following first return of interruptible power, will be about 13 mills per kwh. BPA was authorized by the aluminum companies to secure steam energy during curtailment and 134,000 kw of interruptible were carried on steam, while 9,000 kw were dropped. Part of the bill is expected to be paid by General Services Administration. Marlett said that no specific arrangements have been made as to when or how much of the interruptible load would be supplied from steam if another curtailment should be necessary. In such event, interruptible customers would have a choice of authorizing steam or being off for from one-half to one hour during peak periods. If peak deficiency becomes an energy deficiency also, customers may decide how much of any available steam they want to buy. Estimated cost would be 12-15 mills.

PUC Reports on California Power Resources

California's Public Utilities Commission has reported that the "Defense Production program is the most serious threat to adequate electric resources" in the state. The statement was in an interim report on an investigation of the power situation being made at its own motion. The commission said that any delay in constructing new plants as scheduled might, if 1952 is dry, reduce electric power margins at peak periods to only 2.5% instead of the normal operating margin of 12 to 15%.

Glacier View Dam to be Discussed

Revival of the proposed Glacier View hydroelectric project in Montana, dropped two years ago because of opposition from the National Parks Service, was to be discussed at a meeting of the Columbia Basin Interagency committee Dec. 12 in Spokane. Dale E. Doty, assistant secretary of the Interior, was quoted as saying that the department will oppose any plans for a dam that might flood part of Glacier National Park.

Anaconda to Build Aluminum Plant

Anaconda Copper Mining Co. will build and operate a three-pot-line aluminum plant near Kalispell, Mont., at a cost of $40 million, it was reported last month. Harvey Machine Co. will have a small minority interest in the plant, it was stated.

160-Acre Limitation Declared Invalid

A superior court judge in California has ruled that the 160-acre limitation clause in the U. S. Reclamation Act is unconstitutional as it applies to certain lands within the Central Valley project. The decision is being appealed. (See story, page 115.)

Warren Wants State to Develop Feather River

Governor Earl Warren of California recently made two announcements concerning proposed plans to build a $1 billion power and water project on the Feather River near Oroville. Warren (1) wants the state to pay for construction of the project through the issuance of revenue bonds rather than have the federal government build it; (2) will ask the state legislature at its March budget session to include at least $800,000 for engineering studies of the project. Warren remarked at a news conference that many things must be worked out with the federal government to prevent duplication and overlapping in state development on the Feather River and the federal Central Valley development. The Feather River project includes a 3,500,000 acre-ft dam, power development and transportation of water into southern California below the Tehachapi Mountains.

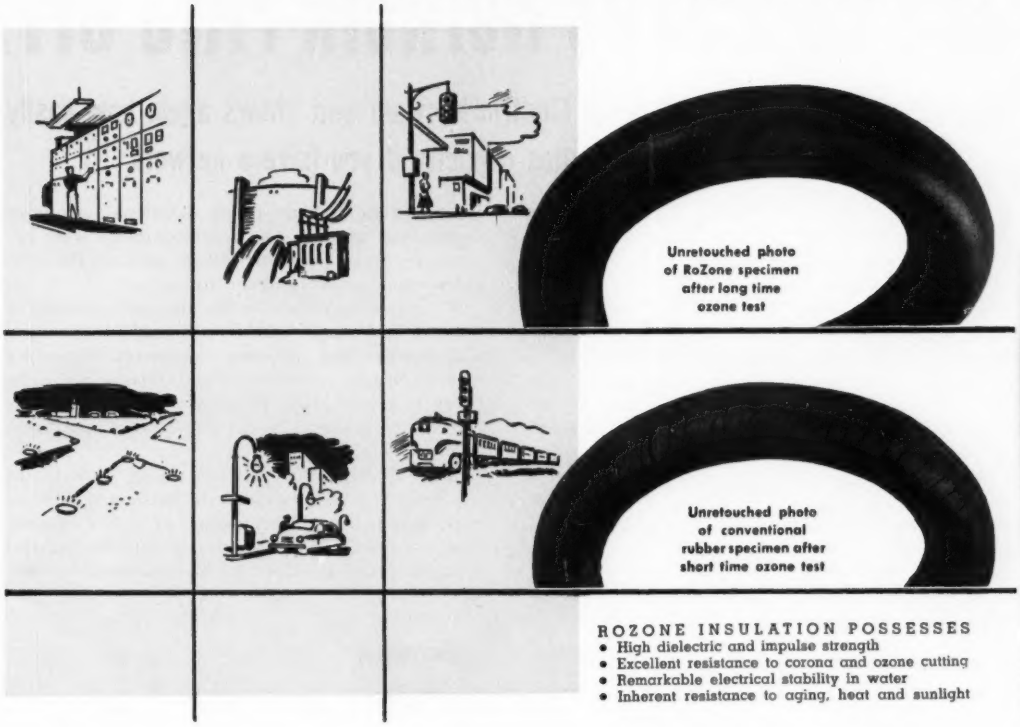
Distribution Plan Filed for WWP Stock

If sale of Washington Water Power stock cannot be arranged by Jan. 1, it will be distributed among the stockholders of its parent company, American Power & Light, according to the distribution plan filed with SEC on its order. Distribution plan contained two qualifications: It would not be effective if American had filed the notification of proposed sale to Washington PUDs by Jan. 1; no formal hearings would be held on the plan before Jan. 1. The plan contemplates distribution of one share of WWP stock for each share of American held. This would mean reclassification of the WWP stock, now numbering 2,541,800, to make it conform to the 2,342,411 shares of American capital stock. American would transfer and assign to the Washington company, as a capital contribution, all of the 3,000 shares of outstanding capital stock. (100 par) of Washington Irrigation & Development Co. and any claims American has against that company. American would have its charter amended to reduce the capital represented by its 2,342,411 shares of capital stock from $50,875,000 to $500,000.

Rome RoZone

THE SUPERIOR OZONE-RESISTANT INSULATION

adds years to cable life...


Unretouched photo of RoZone specimen after long time ozone test
Unretouched photo of conventional rubber specimen after short time ozone test

ROZONE INSULATION POSSESSES

- High dielectric and impulse strength
- Excellent resistance to corona and ozone cutting
- Remarkable electrical stability in water
- Inherent resistance to aging, heat and sunlight

The photos above tell their own story. At the top is RoZone insulation after being subjected to an ozone atmosphere for a period well in excess of specification requirements. Note that there is no deterioration of compound . . . no surface checking. Below is conventional rubber insulation after a much shorter ozone test. These unretouched photos demonstrate clearly the superiority of RoZone under conditions of ozone cutting when higher voltages are involved . . . all of which means longer service life and greater dependability.

Specifying RoZone pays off on many installations. For example, high voltage power circuits . . . station or supervisory control signal cables . . . street lighting cables . . . airport lighting and control cables as well as general purpose wiring where high quality and long life is paramount.

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THE LOAD GROWS AND San Francisco's Network PAYS OFF

Installation of this newest General Electric Network unit shows again how easily you can add new distribution capacity if you have a network

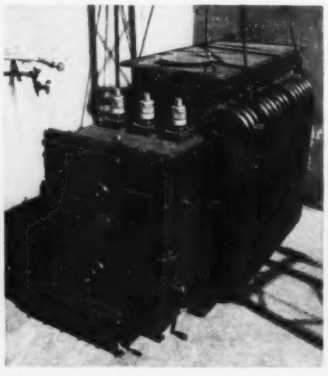
For more than 20 years downtown San Francisco has enjoyed the advantages of its secondary network—virtually uninterrupted service and uniformly good voltage. And Pacific Gas and Electric has profited from the complete flexibility for meeting load growth—on an orderly, step-by-step basis—without any rearrangement of secondaries or service entrances.

The installation of this 500-kva G-E network unit demonstrates a network's flexibility and economy for meeting load growth problems. When additional capacity was needed to meet the rising load in downtown San Francisco, P G & E simply constructed a transformer vault midway between two existing units and extended a primary feeder two blocks. Since the secondary cable passed by the vault site, connections were easily made and the new transformer was ready to pick up its share of the network load. That's all there was to it. Little or no additional secondary copper was needed! And rearrangements were unnecessary because the low-voltage grid, *not* the individual transformer, feeds the load.

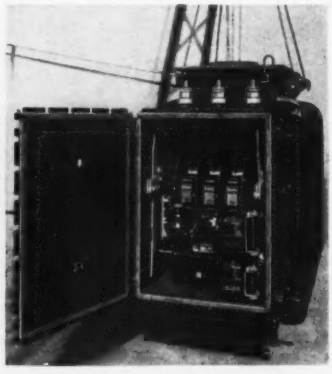
When you investigate the flexibility and economy of networks, be sure to consider the extra advantages of G-E standardized network equipment. Repetitive manufacture of standardized units means faster delivery at lower price. Refinement of design—made possible by quantity production—lowers installation and maintenance costs.

With application experience dating back to the inception of networks, General Electric can help you with all your network problems. For further information, see your G-E representative, or write for Bulletins GEA-5024 and GEA-2017D, General Electric Company, Schenectady 5, New York.

Faster delivery—lower price: G-E Standardized Network Equipment eliminates special engineering and drafting—simplifies purchasing. Quantity production methods reduce manufacturing and assembly time. You get faster delivery at lower prices.



Minimum vault sizes: Both high- and low-voltage cable terminals are well below top of transformer, permitting vault depth of 7 ft. to roof slab. With servicing done from the two ends, vault can be of minimum size for lower installation costs.



Less maintenance: All accessories conveniently grouped at high voltage end of transformer—network protector can be rolled out for inspection—gages are at eye level for easy reading.

GENERAL ELECTRIC

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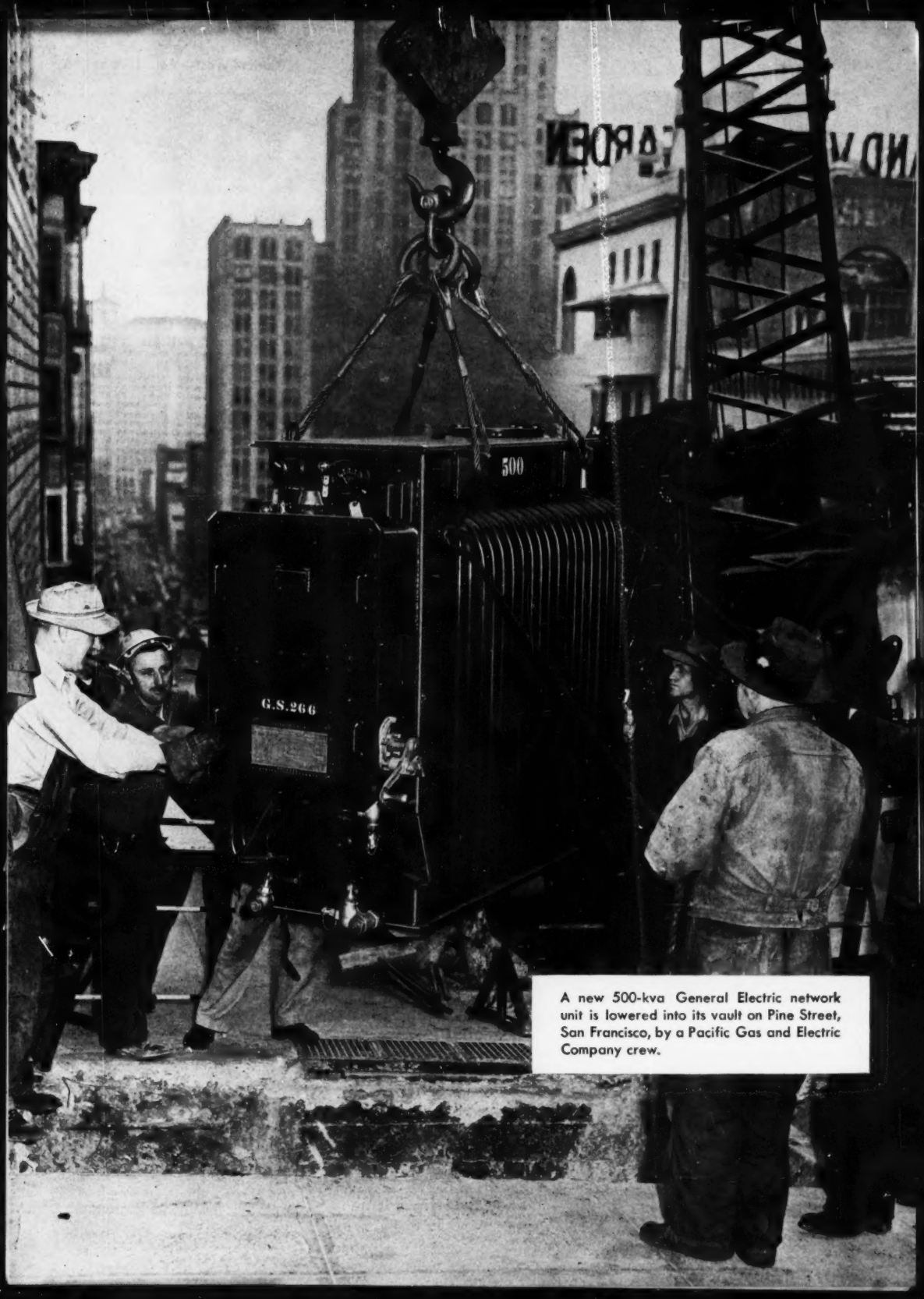
With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.



A new 500-kva General Electric network unit is lowered into its vault on Pine Street, San Francisco, by a Pacific Gas and Electric Company crew.

THIS MONTH'S NEWS

Northwest Companies Have Five-Year BPA Contract

Major privately owned utilities in the Pacific Northwest will get up to half a million kw of federal power per year under a five-year contract approved by Interior Department.

The contract, signed by Bonneville Power Administration acting for Interior, and five major utilities in the area, provides a firmer basis for future planning than the utilities have had previously. In the past, all utilities except Montana Power Co., have contracted for Bonneville power on a year-to-year basis.

Major accomplishment of the new contract, from the standpoint of private utilities, is they are given a definite niche in the priority ladder for federally produced power. The contract promises them BPA will deliver up to 500,000 kw of electricity before making any further firm commitments to industrial customers.

For the present, rates will remain at $17.50 per kilowatt year, but provision is made in the contract for increases.

Companies involved are Portland General Electric, Pacific Power & Light, Puget Sound Power & Light, Washington Water Power and Mountain States Power.

As the Bonneville Act requires, public bodies and cooperatives will get first call on all the power marketed by BPA. Next block of available power will go to industrial customers who already have firm commitments from the agency.

Private utilities come next down the priority ladder. All power in excess of the public body requirements and industrial commitments up to half a million kw will go to the five utilities.

Next block of BPA power—70,000 kw—will go to firm up interruptible power for the smaller industries and specifically not for aluminum producers.

After that, privately owned utilities will have another call on the BPA-marketed power, if there is any. This block of power will be equal to the sum of all firm industrial loads of 2,500 kw or more that have in the interval been added on the systems of both preference customers and the private utilities. These loads are considered to be an addition to the normal load growth of the systems.

Further provision is made for power distribution to the private utilities, but the terms of the present contracts will probably expire before sufficient power is produced at BPA projects to make this possible. It is estimated that it will be the end of 1954 before the five utilities will be receiving their full share of the 500,000 kw on which they have a priority standing.

Fifty-Year License Is Recommended for Pelton

William J. Costello, FPC presiding examiner, has recommended that FPC issue a 50-year license to Portland General Electric Co. for the Pelton project. He said that the company's plans for conservation of the fishery resources would provide a means for maintaining present runs of migrant fish and that construction of the development, accompanied by an adequately financed and well-managed hatchery program would have no materially adverse effect upon the fishery resources of the region.

Costello last summer recommended denial of City of Tacoma's application for its Cowlitz development on grounds that plans for fish protection were not fully enough developed. He said that the two cases could be distinguished on the basis of the relative size of the present and potential fish populations in the two streams and the difference between the conservation proposals. He pointed out that Tacoma had proposed novel fish passage facilities over and through two high dams, while plans for Pelton include orthodox hatchery propagation of existing fish runs, with no effort to provide means for fish to cross the dam in either direction.

● **Mead substation** of the Bonneville Power Administration near Spokane has been renamed in honor of the late Glenn H. Bell, the agency's first representative in Spokane. Bell was largely responsible for location of the substation, BPA officials said.

Wilson Approves Cowlitz, Pelton Hydro Projects

Defense Mobilizer Charles E. Wilson last month put his stamp of approval on two Pacific Northwest hydroelectric projects, urging speedy approval by Federal Power Commission.

Wilson also reiterated his support of a bill that would authorize federal construction of eight fuel-fired electric generating plants in the area, but did not give an outright promise that materials would be available for their construction.

Projects receiving Wilson's approval were City of Tacoma's 225,000-kw Cowlitz River development and Portland General Electric Co.'s 108,000-kw Pelton plant on the Deschutes. License applications for both projects are still under FPC consideration.

The action came after Wilson conferred with Republican Senator Harry P. Cain of Washington and Frank Ward, superintendent of Tacoma's light division. Wilson sees the projects as one means of strengthening power supply in the Pacific Northwest to meet defense production needs.

But on the fuel plants, which Bonneville Power Administration proposes to build, his plea was less urgent. He said it might be well to have Congressional authorization for the proposed plants so they could be built if materials were available. Requests for funds for construction could wait until the power picture in the area is clearer, he said.

Federal Power commissioners recently heard oral arguments on the application for the Cowlitz project license. Main opposition came from fishing interests. A spokesman for the Washington State Sportsmen's Council told reporters during the course of the hearing that his organization would appeal the decision of FPC to the courts if it grants a license for the project. A recommended decision, presented by an FPC examiner, found that valuable fish runs might be destroyed by the proposed project, and said a license should not be granted.

This same examiner has recommended granting a license for the Pelton project, although fishing interests have also fought this project.

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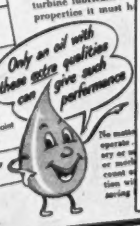

ONE YEAR AGO Shell published the advertisement at left. It reported a remarkable case history about Shell Turbo Oil: 88,000 hours of service in a power company turbine...trouble-free turbine lubrication the whole time...the oil itself still in like-new condition.

This year adds another chapter. Now—the same charge of Shell Turbo Oil has gone more than 96,000 hours. The company has enjoyed another year of trouble-free turbine lubrication. And the oil is STILL in like-new condition.

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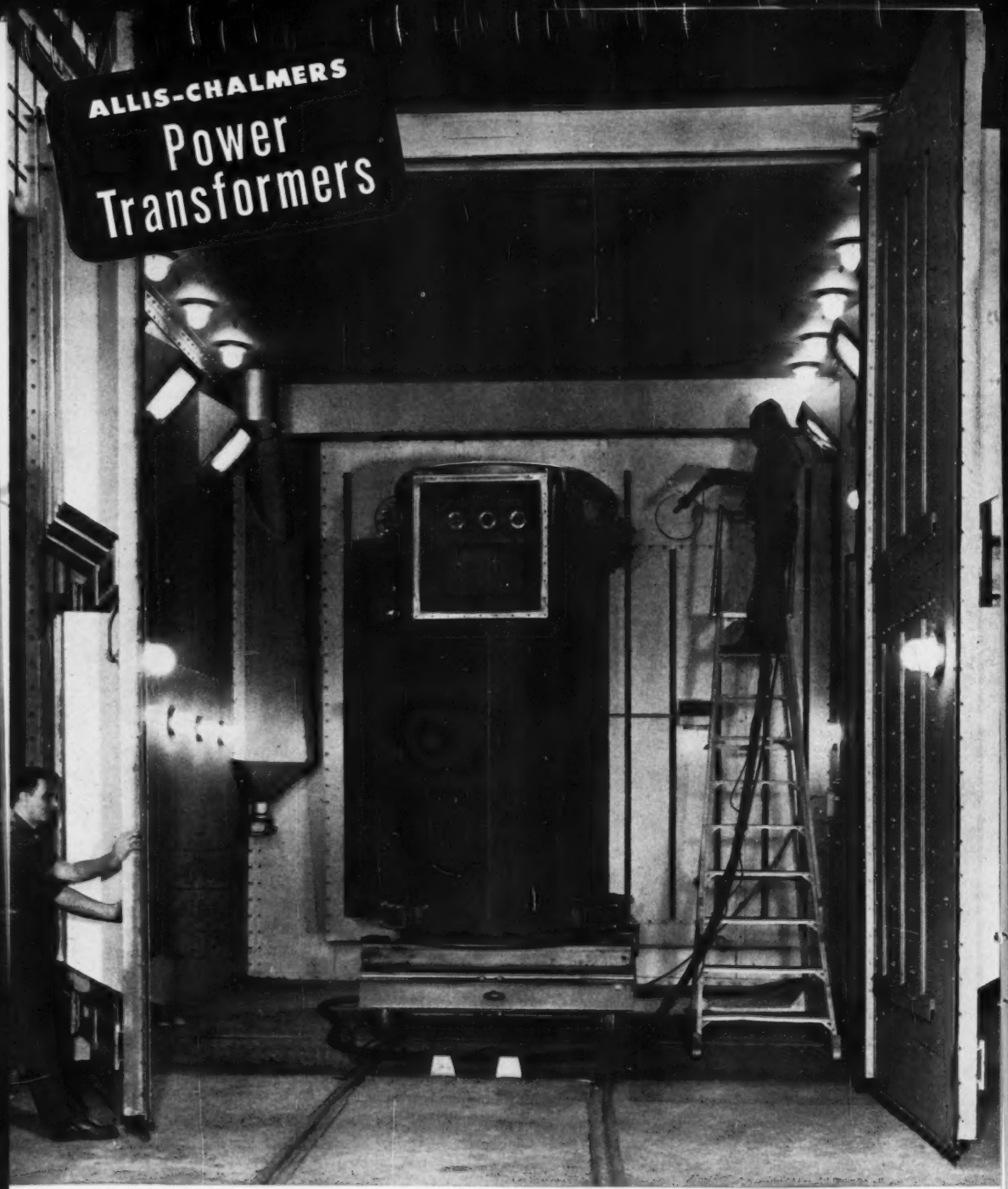

CORROSION RESISTANT FINISH. Tanks are shot blasted in this booth to prepare their surfaces for painting. Three coats of paint provide a tough, corrosion-resistant finish. Radiators have a high quality protective coating that is the result of dip-Bonderizing and rotary flow painting.

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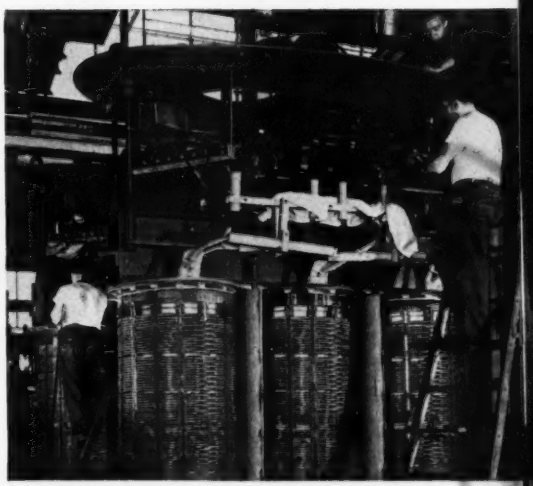
OREGON UTILITY Boosts Capacity

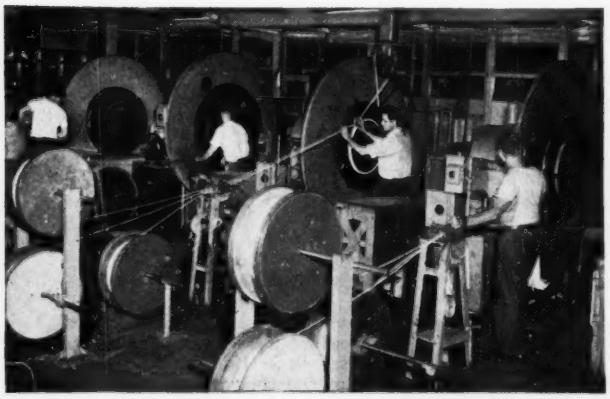
ADDS THREE 6,000 KVA ALLIS-CHALMERS POWER TRANSFORMERS

OREGON RESIDENTS use three times more power than the national average. Records show that 99% of the farms and suburban homes in the area served by the Portland General Electric Company are electrified. And Allis-Chalmers power, distribution and network transformers help PGE — the state's largest electric utility — distribute the power. These 6,000 kva transformers step up capacity for Salem, the capital city of Oregon.

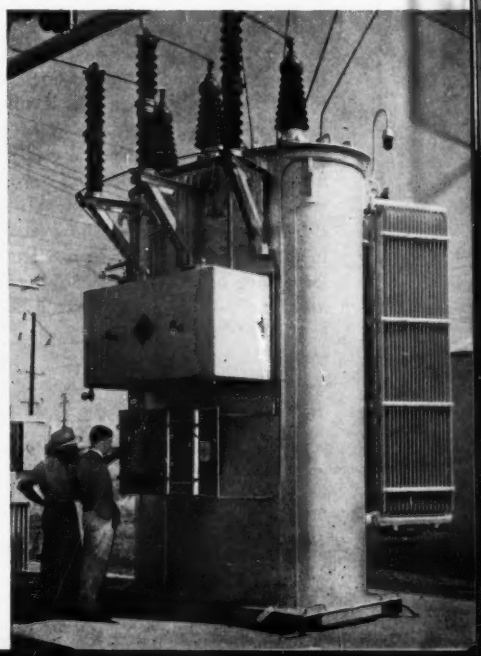
Repeat orders from PGE — and from utilities across the country — are evidence that Allis-Chalmers power transformers are providing dependable, on-the-job service day in and day out. For more details call in your A-C sales representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Offices in 64 principal cities. A-3542



GOOD WORKMANSHIP. Winding and core structure are securely supported and braced. Machine wound tubes, anchored in a sturdy clamping, support and insulate the leads. Good workmanship characterizes assembly work in all stages of transformer assembly.



WINDINGS ARE UNIFORMLY TIGHT. A battery of winding machines winds coils simultaneously from a continuous conductor. This method maintains uniform tightness throughout the winding process and eliminates internal connections. Spacers, uniformly spaced and cemented between coils, give good support and promote coolant circulation.



MORE POWER. This 6,000 kva transformer is one of three Allis-Chalmers power transformers installed at Portland General Electric Company's Middlegrove substation to boost power capacity.

Now! A HEAVY-DUTY, 4-WAY EXPANDING EARTH ANCHOR FOR POWER TRANSMISSION AND HEAVY DISTRIBUTION LINES

This new P-L 4-way All-Steel, Expanding Earth Anchor is designed for use on power transmission and heavy distribution lines . . . 10" diameter—projected area 200 sq. in. expanded with nominal holding power classification of 20,000 pounds . . . Incorporates ALL the features of the smaller 2-way and 4-way anchors—features proven by use in the past few years in over a million installations . . . Exceptionally rugged and possessed of tremendous holding power, P-L 4-way Anchors are easy to install. A few blows from the spreading tool and the installation is complete, with four blades spread deeply into solid, undisturbed earth. P-L 4-way Expanding Anchors tend to position themselves in soil containing rocks or other obstructions thus greatly improving holding power. Solve your guying problems by installing P-L Anchors. Write today or contact your preferred distributor for information and literature. PL51-1

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ELECTION STALLS USBR, KINGS RIVER CONTRACT

A pending election on a proposal to ratify the creation of the Kings River Conservation District has stalled negotiations on a contract between the Bureau of Reclamation and California Kings River farmers on the payment of Pine Flat Dam irrigation benefits.

By mutual agreement, the bureau and the Kings River Water Assn., which had been acting as representative for the water users, have postponed further steps until the outcome of the election, set for Dec. 18.

Only recently there had been indications some progress might be made in the negotiations between the bureau and the KRWA. The bureau signified its willingness to discuss terms of a contract for a lump sum payment, something the association had long been advocating.

One of the reasons the KRWA is anxious for a lump sum repayment contract is that such an agreement would remove the project from the reclamation acreage limitation provisions.

The water users group had offered $14,250,000 but bureau officials in turn submitted a contract draft without figures, indicating, meanwhile, that it could not agree to the KRWA proposal. The $14,250,000, bureau officials pointed out, was the irrigation allocation given to the project just after the war when it was believed the dam would cost about $36 million. Since then the cost estimates have risen to more than $56 million.

The bureau also has made known its objection to another feature of the proposal made by the KRWA. This is that the water rights to Fresno Slough, north branch of the Kings River, be included in the price. The bureau said the Fresno Slough water rights were purchased by the government as part of the Central Valley project and cannot be included in any deal on the Kings River.

● **Cowlitz County PUD** of Longview, Wash., has purchased a prefabricated substation that would be in use in South America today were it not for the Korean war. The unit was built in 1949 for an American petroleum company. Before it could be shipped, however, the Korean war began and restrictions prevented shipment. The PUD has been able to buy the substation, which has been stored in San Francisco, for $13,500 plus freight charges. Manager Glenn Hittle estimates it would cost $22,000 if built today.

LIMITATION CLAUSE IS RULED UNCONSTITUTIONAL

In a decision that, if upheld, would affect all reclamation projects in the state, a superior court judge in Madera, Calif., ruled that the 160-acre limitation clause of the U. S. Reclamation Act is unconstitutional as applied to certain lands in the Central Valley project.

The ruling by Superior Judge Arthur C. Shepard of Fresno dealt with specific lands in the Madera irrigation district. He held that water rights in California were property rights of the state and the federal government has no right to determine how the state's water should be distributed.

He declared that the limitation law could not be applied to land in excess of 160 acres held by individuals prior to the interim contracts signed in 1939 by the Madera district and the USBR for water from Friant Dam. When the Madera district was organized in 1920, the farmers of the area planned to build Friant Dam and to distribute the water without limitation. In 1939 the district sold its water rights and dam site to the USBR.

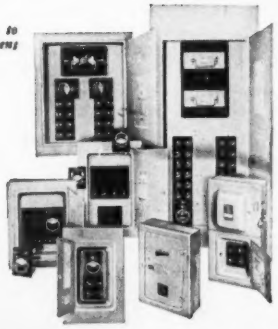
The case on which the decision was made did not ask that the limitation clause be lifted. It was brought by Mr. and Mrs. Phillip Albonico, who asked only that their excess land (939 acres) be removed from the Madera Irrigation District.

● **Clark County PUD** of Vancouver, Wash., will secure a tract of land from the city as a site for a new office building. The tract will be located in an area which city planners hope one day will become Vancouver's "civic center." The PUD's building plans are indefinite.

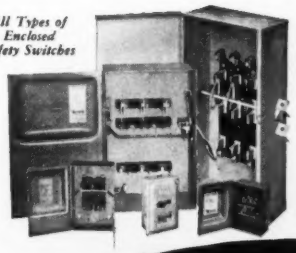
● **Puget Sound Power & Light** Co. has completed construction of a $500,000 service building and warehouse at nearby Renton. With 40,000 sq ft of floor space, the building houses the utility's general store, general garage, drayage department, meter department and transfer-repair center. Its staff of 40 handles $250,000 in supplies monthly.

● **Woodward Governor** Co. of Rockford, Ill., submitted a low bid of $221,396 to the Corps of Engineers for three 19,600-hp hydraulic turbine governors and appurtenances for Albeni Falls Dam near Newport, Wash. The contract calls for delivery of the first governor by Jan. 1, 1954 and the third by Oct. 1 of that year.

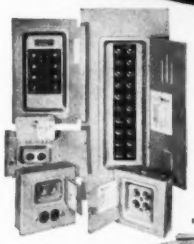
Service Equipment to Meet Every Requirement



All Types of Enclosed Safety Switches



The General Line is the COMPLETE Line



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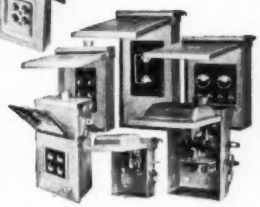

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DUAL SILVER POINT — FULLY AUTOMATIC

FLUORESCENT STARTERS

—completely eliminate annoying blinking and flickering of dead fluorescent lamps!

GUARANTEED — FOR ONE YEAR!

This is a glow switch condenserless precision starter equipped with automatic thermal relay circuit breaker. The relay automatically removes the lamp from the circuit electrically when the lamp becomes deactivated and automatically resets upon interruption of the lamp circuit.

SIMPLIFIES—Replacement of defective lamp automatically recycles starter circuit. No buttons to push—no replacement of starter.

REDUCES COST—Magno-Tronic starters provide exact timing of electrode heating, preventing excessive loss of emission material, thus assuring maximum possible lamp life.

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SP-15-20 For use with 15 or 20 watt lamps.

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B. C. ENGINEERS ASK EXEMPTION FROM ICA ACT

Professional engineers in British Columbia have appealed to the provincial labor minister for exemption from the provisions of the Industrial Conciliation and Arbitration Act, B. C.'s labor code.

R. E. Wilkins, Vancouver registrar-manager of the Association of Professional Engineers of B. C., said there was danger engineers in B. C. would be unionized if this was not done.

He said 50 engineers employed by the B. C. Electric Co. had been compelled to join the B. C. Electric Office Employees' Assn., when they wanted only to remain in their own association.

"The engineer's duties do not permit him to join unions and conform to a rigid number of hours of work each day," Wilkins said.

He said engineers in other parts of Canada are excluded from unions by provincial law, but the B. C. government has said the ICA Act would have to be amended to exclude engineers in the province.

Young Salmon Released in Northwest Experiments

The Washington State Department of Fisheries and the International Pacific Salmon Commission are cooperating in an experiment that involves release of some 200,000 young salmon to be used as "guinea pigs" next spring in an attempt to learn how many fish are killed by going through power turbines or over high dams. The tests, a continuation of experiments conducted last year and this, will take place at the Puget Sound Power & Light Co.'s Baker River Dam near Concrete, Wash.

The fish will be marked by clipping fins. Some will be released above the 265-ft spillway, and others near the turbine intake. Nets below the dam will recover the fish that survive.

● **New rate schedules** filed with the state corporation commission by Arizona Edison cut $117,000 annually from a previously authorized increase of $317,000. The utility prepared the new schedule after customer protests that earlier increases were inequitable. Refunds on charges since June 17 were ordered early in November. The refund will be on all charges in excess of 15% of tariffs in effect prior to that time. Originally, Arizona Edison had been granted an over-all increase of 8%.

Our Defense Program Faces a Crisis

A major crisis will soon confront our defense program.

It is not a crisis in raw materials. To find enough materials, from steel to cobalt, for defense production is a serious problem. But it is one that is being solved.

It is not a crisis in manpower. Shortages of workers with special skills hamper production, but these shortages are being relieved, slowly.

It is not a crisis in manufacturing capacity. American industry's record-breaking expansion is, with very few exceptions, keeping abreast of defense needs.

The coming crisis will be one of finance. It will rise from our failure to provide the means to PAY FOR the defense program we now have under way.

A $15 Billion Deficit?

Congress has approved a defense program which is scheduled to raise *total* federal spending in the year from June, 1952, to June, 1953, to somewhere between $85 and $90 billion. Additional appropriations for more air power and atomic development, which are now proposed, would add several billion dollars.

But Congress has not approved a tax plan to match such spending. With the new levies enacted in this session, tax collections during the 1952-53 fiscal year are estimated to fall somewhere between $70 and $75 billion. That would be roughly $15 billion short of balancing the budget. If the defense program is expanded, the deficit will be that much greater.

We have not yet felt the impact of the crisis that would accompany a federal deficit of this magnitude. Federal tax collections currently are big enough to balance federal expenditures. But the defense program is scheduled to boost the annual rate of federal expenditures $25 billion in the next year.

To Meet the Crisis

By January the crisis will be clearly in sight.

Then the President will present his budget. After that, Congress must act to close the broad gap between government income and government spending. If it fails to do that, the whole defense program will be menaced by weakness in its financial foundations. That weakness might well take the form of another destructive wave of inflation.

We have three ways to meet this crisis.

The best approach, of course, is to cut unessential expenditures. That can make a real dent in the deficit. The second is to collect more

taxes. The third, and by all odds the most dangerous, is to have the federal government meet its deficit by going deeper into debt. Borrowing, which might feed inflation, can easily lead to disaster.

Near Income Tax Limits

It will not be possible to raise taxes to meet the deficit merely by increasing further the rates on corporations and on persons in the upper income brackets. Congress has about scraped the bottom of that barrel.

The Senate Finance Committee said as much in reporting this year's tax bill. The Committee reported that it had "serious doubts as to the feasibility of raising any substantial additional amounts of revenue from income tax sources." The Committee observed that recent tax legislation brings the burdens of most corporate and individual income taxpayers close to the World War II peaks, and actually carries the rates paid by many taxpayers above those peaks.

Our ramshackle federal tax system must be thoroughly overhauled in order to broaden the tax base if it is to produce more revenue—without doing much more harm than good.

The shocking fact is that no one seems ready to act along any line that might enable us to surmount the crisis.

That fact of itself aggravates the coming crisis. And next year's presidential election doesn't make it any easier to move effectively. Both parties will shrink even more than normally from backing any program that might irritate any considerable number of voters.

If we are to meet this crisis on the tax front in an orderly way, the technical work should be in progress right now. To a large extent it is being ignored.

If we are to enforce the vitally essential program of government economy, there is the same urgent need to get under way the spade work that is required.

And if—as a last miserable expedient—we decide to let the federal government drift deeper into debt, it must have a well-developed program of borrowing from individuals and other investors, such as insurance companies, rather than from the commercial banks. Borrowing from commercial banks might speedily translate the deficit into more and more price inflation. No adequate program of borrowing from savings is now in sight.

Now Is the Time

It is possible, of course, that international relations may improve sufficiently to make it safe for us to slow down the rearmament program. If that should happen, the fiscal crisis would not be so critical. But that kind of good fortune has been notably absent in recent years.

Lenin, patron saint of Communism, is quoted to the effect that to destroy a political and social system such as ours "you must debauch its money."

We shall set democracy to digging its own grave if, through our preoccupation with politics during the presidential campaign, we pave the way for further debauchery of our money.

If we really want to avert that disaster, now is the time for us to get going.

Once the crisis is full upon us, it will be too late.

McGraw-Hill Publishing Company, Inc.

SPECIFICATIONS DRAFTED FOR AIRPORT LIGHTS

The San Francisco Public Utilities Commission is drafting specifications for centerline approach lights for the main runway of the city's International Airport.

Plans call for lights every 100 ft for 3,000 ft eastward into San Francisco Bay from the edge of the airport's prevailing wind runway, with a crossbar of lights at 1,000 ft from the runway and a second crossbar at 2,000 ft. The lights, all to be placed at the same height, will be mounted, for easy maintenance, along a trestle of piles extending into the bay.

Since part of the financing will come from federal funds, plans must be approved by both the San Francisco Board of Supervisors and the Civil Aeronautics Authority. The Public Utilities Commission hopes to have the new lights in use early next spring.

The new centerline approach lighting system planned for the San Francisco airport has been used in Britain for some time and is widely favored by U. S. commercial airline pilots.

BPA May Use Helicopters To Carry Crews, Equipment

Success in transmission line patrol with helicopters has decided Bonneville to study possible extension of the service to transportation of maintenance crews and equipment to mountain and desert areas.

Started in 1949 with two helicopters, the present schedule calls for eight helicopters and two supplemental ground patrols annually. During fiscal 1951 BPA copters flew 30,000 miles, each pilot and lineman observer covering major grids about once in six weeks. Cost was about $40,000 ($63,000 with supplemental ground patrol). BPA figures patrol costs, without helicopters, would be $108,000 annually.

● **A 4,000-kw increase** in capacity of the municipal power plant at Fairbanks, Alaska, has been recommended by Frank Mapleton, manager of the municipal utilities system. Cost of the program, with increased boiler capacity, is estimated at $1,500,000. Revamping and extending the city's electrical distribution system, at a cost of $400,000, also is recommended by Mapleton.

● **Sacramento Municipal Utility District** has put into effect bimonthly billing for electric service.

"Line faults quickly, accurately located with G-E oscillographs,"

reports

Niagara Mohawk

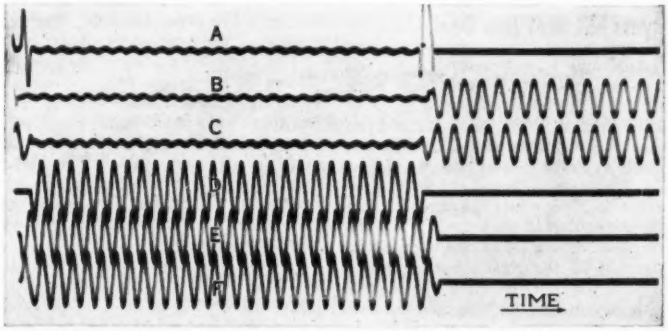
Saves manpower—automatically records faults

Niagara Mohawk Power Corporation reports its Type PM-13 automatic oscillographs are saving many valuable man-hours by accurately locating line faults. For instance, when oscillographs are installed at each end of a transmission line, faults can be located to within a few towers . . . and on many occasions to the exact tower. Maximum benefit comes when a PM-13 is located on each end of a transmission line or spur.

SPOTS FAULTS QUICKLY—Faults are quickly located for correction. Minor faults can also be detected before they cause major damage, thus preventing future outages.

REQUIRES NO OPERATOR—PM-13 starts fast (in 1/240 second), records entire disturbance time, and stops after fault has been cleared. This oscillograph can be tripped by a change in either potential or current, so it can be used at an unattended station. Makes as many as 100 oscillograms without intermediate attention.

For more information, call your G-E representative or write for Bulletin GEC-396. General Electric Company, Schenectady 5, New York.



CLEAR RECORD of 3-phase-to-neutral short circuit — system frequency, 60 cycles. Record shows (A) current in neutral; (B) line voltage (1-2); (C) line voltage (2-3); (D) line current (1); (E) line current (2); and (F) line current (3).

GENERAL ELECTRIC

602-209

REPORT RECOMMENDS PUGET POWER PURCHASE

Seven Washington state PUDs will issue a total of $115,000,000 in revenue bonds to finance the purchase of remaining properties of the Puget Sound Power & Light Co., if they adopt the recommendations submitted to them by R. W. Beck & Associates, consulting engineers.

The report recommends a $93 million offer to Puget Power for its physical facilities, with a further $3.8 million for current assets such as accounts receivable, unread meters, etc. The remaining $8.2 million resulting from sale of the bonds would be marked for current construction, working capital, and acquisition and bond sale costs. These costs would include a 1% commission to Guy C. Myers, who has been representing the PUDs as fiscal agent.

The report places a $203 million valuation on replacement costs of the system and $170 million as that cost minus accrued depreciation.

The tentative purchase proposal, as it now stands, is for acquisition of local distribution facilities individually by the seven PUDs and joint acquisition of the generating facilities and distribution facilities in Pierce and King counties, which have no PUDs.

Frank McLaughlin, Puget Power president, said the proposed sale and disposal of other properties probably would net stockholders between $20 and $23 a share, the latter figure being about the "book value" of the stock. The company has 2,177,879 shares outstanding, all common stock.

Whatcom Will Not Sign with Myers but Will Join Deal

Although it will not sign a contract with Guy C. Myers, New York promoter, Whatcom County PUD of Bellingham, Wash., has agreed to join six other districts in an offer to purchase Puget Sound Power & Light Co. Whatcom followed the same procedure in 1946, when the purchase was declared illegal; says that it would have saved $40,000 in commissions to Myers had the deal gone through. Most of the other districts have signed with Myers and have agreed to give him a 1% commission on all bonds sold for the purchase.

● **City Light** employees at Seattle will carry identification cards under a plan approved by Mayor William F. Devlin. Affecting all municipal employees, the plan was proposed at a Civil Defense Board hearing. The cards, similar to those already carried by policemen and firemen, will carry the signature, fingerprints and photograph of each employee and the signature of his department head. They will be uniform in design but in varied colors to designate departments. Security screening of employees not already subjected to this procedure probably also will be required.

Mobile Power Unit Ready To Serve Pacific Northwest

A mobile power unit, capable of producing 10,000 kw, has arrived at the Bremerton, Wash., Naval shipyard and is expected to be ready for use about Dec. 15, should the Pacific Northwest power shortage become critical.

The unit, a seven-car power train, is being connected with the yard's stationary 12,000-kw steam plant. The output of one or both will be used to meet the yard's needs if and when Bonenville Power Administration is unable to meet its full commitments and shuts off interruptible power.

Unless the region is subjected to colder weather, however, prospects are that power supplies will be sufficient.

Insurance Companies Join Suit Against Cooperative

Forty-one insurance companies have joined in a suit filed in United States district court at Portland, against the Wasco Electric Cooperative to recover money paid out for losses suffered by the Tygh Valley Lumber Co. in a fire Sept. 19, 1950. The fire destroyed the company's planer mill.

The complaint alleges that power failure in the co-op system rendered electrically driven water pumps useless and prevented mill employees from extinguishing the fire. A total of $132,519 is demanded. The insurance companies claim they made adjustments either for fire losses or time lost while the mill was shut down because of the fire.

● **Idaho Power Co.** has accepted the joint bid of Blyth & Co., Lazard, Freres & Co. and the First Boston Corp. for its $15 million bond issue. The three firms will purchase or underwrite the bonds at a price to Idaho Power of 100.86 and an interest rate of 3.25%. Initial offering price to the public will be 101.50 to yield about 3.17%.

NORTHERN WASCO PUD IN FINANCIAL DIFFICULTIES

Economy measures and a campaign for new customers have been instituted by the Northern Wasco County PUD of The Dalles, Ore., in an effort to prevent bankruptcy.

Operating losses are running about $1,000 a month and payment is due soon on the principal of its $289,000 worth of outstanding bonds. Audit of the books shows a deficit Nov. 1 of $42,551, as against a $27,402 deficit on Dec. 31, 1950.

First action was to drop E. C. Rash from his $7,800-a-year job as manager. Through arrangement with the Wasco County Electric Cooperative, which serves rural areas in Wasco County, Eric Johnson, co-op manager, will manage both utilities.

Johnson explained that this arrangement does not involve any merger of the two organizations but is a temporary device only. Both utility boards are anxious to avoid default on PUD revenue bonds and resultant bad effect on future financing by Northwest public agencies, it was pointed out.

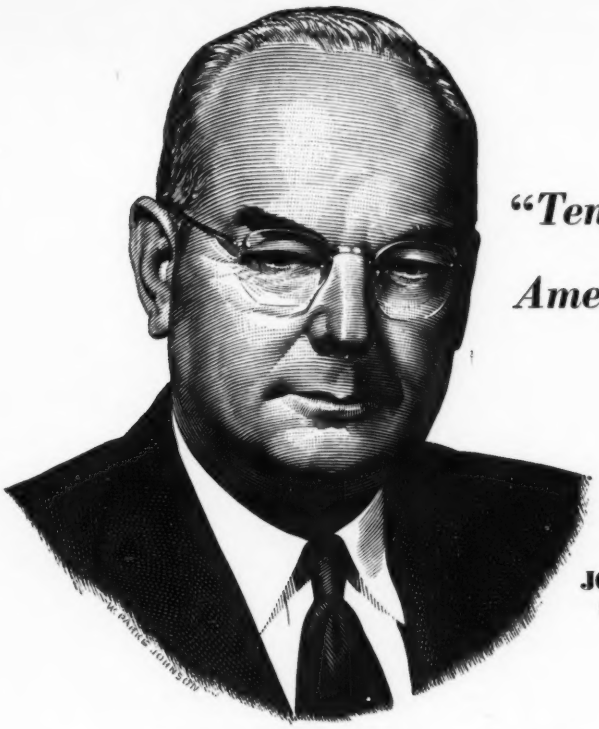
Directors of the PUD admit that cutting the district's monthly deficit does not solve the problem. The district is quite heavily in debt. Its chief creditor is the Bonneville Power Administration which it owes $18,150 for energy.

Payment on bond principal and interest in 1952 will amount to $16,250 and in 1953 the amount will increase to $17,050. All bonds are held by Juran & Moody, St. Paul, Minn.

At present the district has 750 customers and needs 1,200 to break even. In the main new customers would have to come from Pacific Power & Light Co., which has served The Dalles for many years and has retained some 3,000 customers despite PUD promotion.

In August 1950, the district discussed plans to buy Wasco County properties of PP&L, offering what company officials called "only a small fraction of the value of the system." The district hired Tudor Engineering Co. of San Francisco to make a survey to determine the value but no results have been announced.

The Northern Wasco County PUD has been a losing venture from the start of operations in April 1949. It set its rates under those of PP&L, but the private company asked for and secured permission from the PUC to meet the PUD schedule. Later the PUD proposed a 10% increase, but no formal application for such an advance was made.



"Ten years ago America's Business publications . . ."

JOHN W. SNYDER
Secretary of the Treasury

"Ten years ago America's business publications, as a voluntary public service, presented for the first time advertisements outlining the Payroll Savings Plan for the regular purchase of U. S. Savings Bonds, and urged its acceptance. During the decade which has passed, American business has consistently supported the Payroll Savings Plan and made it a success. Continuation of this cooperation with the Treasury is most essential in the present emergency. Expanded sales of Defense Bonds will assist importantly in checking inflation, in preserving economic stability, and in furthering the over-all defense effort."

In ten brief years:

- From 700,000 in 1941 employee participation went to 27,000,000 at the peak of the war.
- Companies with Payroll Savings Plans jumped from 10,000 in 1941 to more than 175,000 during the war.
- Since January 1, 1951, the number of men and women on Payroll Savings has grown from 5,000,000 to 6,200,000.
- On September 30, 1951, individuals held Series E Bonds totaling $34.6 Billion—more than $4.6 Billion greater than on V-J Day.
- In the January-September, 1951, period, 33,418,000 $25 E Bonds were purchased—a gain of 17% over the same period of 1950. 8,966,000 $50 E Bonds were sold in the first nine months of 1951. *$25 and $50 denominations are the bonds bought by Payroll Savers.*

Congratulations to the executives of industry and the publishers of business papers for their continuing effort in promoting systematic savings through the Payroll Savings Plan—the plan that protects America and Americans.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

ELECTRICAL WEST

New ways in which electric power and equipment can be utilized to improve lumber mill productivity were discussed by more than 100 members of the two industries who met in Eureka, Calif., recently under sponsorship of the Pacific Gas and Electric Co., A. Brizard Inc. and General Electric Co. R. W. Matthews, secretary of Brizard, was general chairman. Afternoon session featured a panel on distribution systems, improved motorization, new electric veneer lathe and log carriage drives, portable mills and two-way radio communication. The panel was headed by C. A. Carriere, G-E, San Francisco, and included from the same company: R. L. Gooch, application engineer, San Francisco; J. M. Dodds, engineering consultant, San Francisco; S. H. White, application engineer, Seattle; M. Rhine, assistant to manager, Pacific district; F. I. Deetken, communications engineer, San Francisco. K. R. Ross, manager, manufacturing industries department, Schenectady, gave examples of greater productivity in eastern heavy industries through mechanism and electrification of mills. Evening speaker was George C. Tenney, editor of Electrical West, whose talk showed the westward tide of industry. J. H. Gumz, Defense Power Administration, told of power expansion in the Northwest. Members of the group are shown here as they examined the display of electric drives and equipment

Steam Plant Proposed For Central Arizona

Arizona's three major utilities, Central Arizona Light & Power, Salt River Valley Water Users Assn. and Arizona Edison, are jointly studying plans for a proposed 120,000- to 180,000-kw steam generating plant to be built in central Arizona at a cost of from $15,000,000 to $22,500,000.

No decision has been made as to which utility, or combination, will actually build the plant.

Location of the plant hinges principally on plans of the Magma Copper Corp., which will require some 35,000 kw for operation of the San Manuel copper mine under development near Mammoth, 60 miles northeast of Tucson.

If Magma contracts to take power from the steam plant, it will be located somewhere south of Coolidge and will have a capacity of 180,000 kw. In this event the plant would be fitted into the Bureau of Reclamation system serving southern Arizona.

If Magma builds its own power facilities at the mine, the utility plant will be located in the vicinity of Phoenix, with a 120,000-kw initial and 180,000 ultimate capacity.

● **The Joint Crafts Council** (AF of L), a group of 21 unions, including Local 77, IBEW, have approved contracts negotiated with the Seattle City Council for employees of City Light. The contracts are the first formal agreements between the unions and City Light. The Joint Crafts was formed as a result of an agreement last January that averted a strike of electrical workers against City Light.

● **A $3 million "showcase"** substation, designed to sell utility service to the public, will be built in downtown Vancouver by B. C. Electric Co. The 100,000-kv station will be three stories, with a 4,000-sq-ft front on a main downtown arterial finished in glass. Main control panels will be in full view and at night the building and equipment will be dramatically lighted. Conducted tours are planned for students and public.

● **General Electric Co.** received the contract for three generators for Army Engineers Lookout Point Dam on a reduced award figure of $2,223,530. G-E's original bid was $2,292,763, higher than that of English Electric Co. Ltd. of Stafford, England, but English Electric's promised delivery date was some nine months later than that specified.

● **Klickitat County PUD** of Goldendale, Wash., has received a low bid of $66,670 for construction of an office, warehouse and storage yard at White Salmon.

Jackson to Amend Bill for Northwest Steam Plants

Rep. Henry L. Jackson, author of a bill that would authorize construction of eight auxiliary steam power plants in Washington and Oregon, has announced his intention of amending the bill.

Speaking at Ellensburg, Wash., he declared he will request an amendment authorizing construction of plants with a total output of 400,000 kw, without specifying the size of individual units. The original plan, as reported out of the House Public Works committee, called for three 100,000- and five 20,000-kw units.

Bonneville Power Administration, which would manage the plants, has indicated the first large plant should be constructed at Coos Bay, Ore., with the second in the area between Tacoma and Longview, Wash., and the third unit on Puget Sound, between Tacoma and Bellingham. Cle Elum also has been suggested as a site.

● **Pend Oreille PUD** of Newport, Wash., has asked FPC for a license to build its $16 million Box Canyon hydroelectric project on the Pend Oreille River. The development calls for a dam 260 ft long, forming a reservoir extending 55 miles upstream. The 60,000-kw power house would be 400 ft below the dam.

Announcing IM-50 Watthour Demand Meters

New single-phase meters now available with indicating or cumulative registers

General Electric's I-50 meter line has been extended to include the IM-50 watthour demand meter. Primary applications are for small commercial and industrial loads.

WITH M-30 INDICATING REGISTERS, you are assured of positive reset by Geneva action . . . with no shock. These registers have a long, 9½-inch scale. There are no springs, latches, or governors. Reset load on the motor is low . . . and motor life is long. This unit, with a minimum number of parts, provides maximum flexibility for all indicating demand measurements.

WITH M-31 CUMULATIVE REGISTERS, these meters provide an indication of maximum demand plus the cumulative value of previous maximum demands.

All construction features of I-50 watthour meters are also included . . . magnetic suspension, butyl and polyethylene insulation, and others.

For more information, contact your G-E representative or write Section 601-52, General Electric, Schenectady 5, N. Y.

NEW IM-50 METERS are available for socket or front connections. They can be used on circuits where voltage is either 10% above or below rated meter voltage. Registers are available separately.

GENERAL ELECTRIC

601-52

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

NEWS ABOUT PEOPLE

Gerster Heads G-E Supply in Western States

Activities of the General Electric Supply Corp. in the 11 Western states are to be directed by Harry C. Gerster, newly appointed vice-president in charge of the Western states region who will make his headquarters in Los Angeles. This move is part of a national program of decentralization in which four regional vice-presidents will supervise GESCO activities throughout the country. Eleven new sales districts and 40 new offices will be added in a program aimed at improving customer service and rendering better sales representation to the many companies for which GESCO serves as a distributor. Under the program new Western sales districts ultimately will include Sacramento and Phoenix.

Gerster, who has been manager of the Los Angeles district since 1949, will be succeeded by R. J. West, present manager at Dallas. Gerster has been with G-E Supply for 20 years; was Northwest district manager before his transfer to California in 1949. West began his General Electric career in 1934, having previously been on the sales staff of the Mathews Supply Co. of Birmingham, Ala. After a brief stint in Miami he was transferred to Dallas. He became appliance sales manager of that branch in 1939 and district manager in 1944. C. H. Thrane, who has been supply sales manager in Los Angeles, becomes assistant district manager.

● **W. P. Gullander,** formerly manager of the Seattle district of General Electric Supply Corp., has been transferred to General Electric Co. as manager of the subcontracting department of the defense products division. The Seattle post has been taken by **O. B. Hubenthal,** who joined the company at Spokane, Wash., in 1928 and most recently has been sales manager for supplies and apparatus in the district.

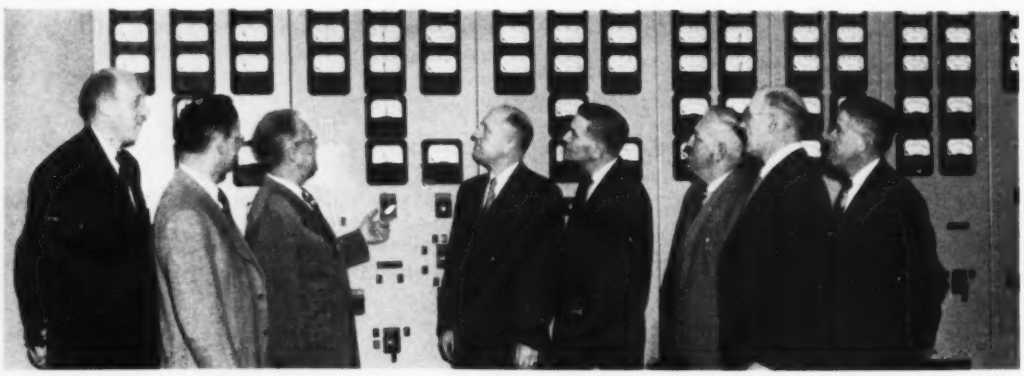
● **Max H. Kight** has been appointed head of the USBR's electrical branch of the Division of Design and Construction, replacing **Henry H. Plumb,** who retired Oct. 31. Kight, who joined the bureau in 1923, was associate head of the branch. Plumb's retirement completed 33½ years of service with the bureau.

● **Richard McKay,** assistant general manager of Washington Water Power Co. at Seattle since 1942, has been appointed manager of the Seattle Steam Corp. The appointment was announced by **Andrew Steers,** president of the newly organized company that has taken over the Seattle steam properties of Puget Sound Power & Light Co. McKay began service with Washington Water Power more than 30 years ago.

● **George F. Gayer,** formerly engineering manager for the Sunnyvale plant of Westinghouse Electric Corp., has been promoted to assistant manager there. He first joined Westinghouse as a graduate student in 1929; left in 1940 to become chief engineer for the Seattle-Tacoma Shipbuilding Corp. at Tacoma. In 1943 he went to work for Joshua Hendy Iron Works at Sunnyvale as chief engineer and, since acquisition of the Hendy plant by Westinghouse in 1947, has been engineering manager.

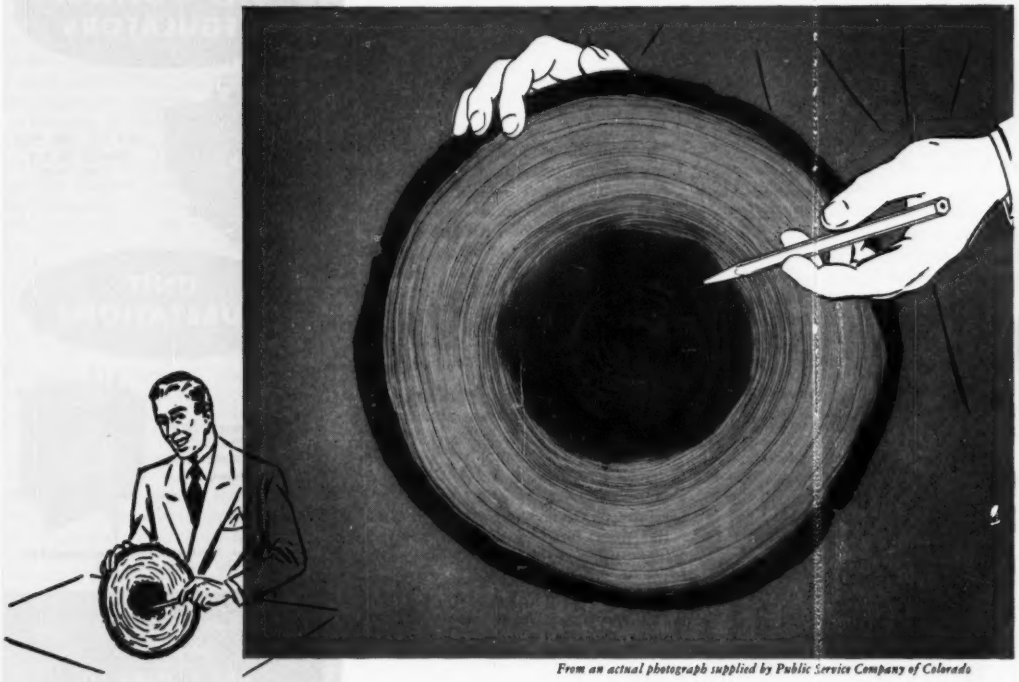
Gayer

● **Joseph H. Cox,** pioneer in the field of lighting research and mercury arc rectifier engineering, has been appointed engineering manager for the Westinghouse Sunnyvale Works. Previously Cox had been supervisor of electrical engineering and supervisor of quality control for the plant. He holds more than 20 patents, was responsible for development and design of the Ignitron rectifier, following discovery of the Ignitron principle by Dr. J. Slepian. During World War II, he helped engineer and develop vital vacuum and leak-detecting apparatus for the atomic bomb project.



At ceremonies energizing Seattle City Light's $2,500,000 Broad St. substation are left to right: John Nelson, assistant superintendent; Hugh Silliman, supervising senior engineer in charge of designing and building distribution substations; Superintendent E. R. Hoffman, closing switch; W. J. Olson, power operations engineer; Paul Edquist, senior engineer, electrical relays; Herb Strandberg, project engineer; Willis Whittaker, electrical constructor foreman; J. J. DeNise, senior engineer, inside construction

"...every management man should know how to MAKE STANDING POLES LAST LONGER"



From an actual photograph supplied by Public Service Company of Colorado

OSMOPLASTIC *penetrates deeper to protect longer*

Here's graphic proof that the Osmoplastic groundline treatment is the practical and proven way to add *many years* of extra service life to your older standing poles. The above illustration is an actual photo of a test disc cut from 8" below the groundline on a Western Red Cedar pole by the Public Service Company of Colorado. This pole had originally been incised and treated with creosote. Six years ago it was inspected and Osmoplastic applied. The pole was removed from service for reasons other than decay in 1950 and discs were cut from the groundline area.

The outer black band is the original creosote. Now look at the great yellow area! That's how far Osmoplastic penetrated right through the original creosote!

This complete yellow section was created by subjecting the disc to the zirconium alizarine reagent test which determines the presence of sodium fluoride in toxic amount. Osmoplastic is protecting this whole yellow area against decay and the only area not reached by Osmoplastic's super-penetration is the gray portion in the very center. Let us tell you more about our combined groundline inspection and treating service for older standing poles.

OSMOSE **DAN KAMPHAUSEN CO.**

CONTINENTAL OIL BLDG. DENVER 2, COLORADO

2869 S.W. GREENWAY AVE. PORTLAND, OREGON

All the strength and durability inherent in steel are combined—with definite economies— in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

EVERSTICK ANCHORS

For new construction and maintenance —Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resilient, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

● Changes in the organization of both the purchasing and stores departments of San Diego Gas & Electric Co. were recently made by President E. D. Sherwin upon the retirement of **S. R. Robinson,** purchasing agent. **William deWaard** was appointed manager of the newly combined purchases and stores department. He had been superintendent of the stores department since 1947. He started with the company in 1913 as a clerk-typist. **Phil E. Rimoldi** was appointed purchasing agent. He started as a plant manager in 1923 and has lately been assistant purchasing agent. He will have supervision over the purchasing section of the new purchases and stores department. **Roy E. Fritzer** has been made general storekeeper. He began with the company in June 1921 and has worked up from storeroom clerk to assistant foreman, then foreman, and in 1948 was stores supervisor. He will have supervision over the stores section of the new department.

● **T. M. Blakeslee,** former operating engineer of transmission and communications for Los Angeles Department of Water & Power, has been promoted to assistant electrical engineer in charge of operation. He will be administrative assistant to **Ivan L. Bateman,** head of the power operating and maintenance division, will act as division head in Bateman's absence and have administrative control of the clerical and statistical forces of the division. Blakeslee has been with the department for 25 years.

● **P. D. Barber** became manager of Graybar Electric Co.'s Portland office on Nov. 1, according to announcement by J. P. Lawton, Seattle district manager. He succeeds **John Reine,** who is being transferred to Minneapolis as district manager. Barber was Duluth manager before his transfer. He joined Graybar in 1934 at the Minneapolis warehouse.

● **Joseph N. Kemple** has been appointed product manager, wire rope and electrical wire, by Columbia Steel Co., San Francisco. He succeeds **T. L. Harp,** who has been made assistant manager of the Tramway division. Kemple joined the company at Pittsburg, Calif., in 1947; was transferred to the southern sales division in Los Angeles in 1949.

● **John Doyle,** who had been sales representative for Sylvania Electric Products Inc., Los Angeles, was promoted to division manager of the company's Detroit office Nov. 1.

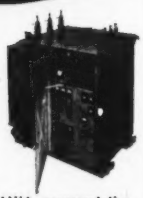
Pennsylvania TRANSFORMER CO.
INTRODUCES ITS NEW LINE OF

STEP VOLTAGE REGULATORS

20.8 Kva, 2400 Volts through 750 Kva, 13,800 Volts

UNIT SUBSTATIONS

1000 Kva through 3000 Kva, 12,000 Volts through 34,500 Volts Primary



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Bought and Sold
New and Rebuilt

ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.
Cash For Your Surplus

● **Two veteran officials** of Pacific Power & Light Co.—D. F. McCurrach and George L. Myers—have retired after a total combined service of 70 years. McCurrach, assistant vice-president, a native of Scotland, entered the electric field in 1911 after engaging in engineering work in India and British Columbia. He joined Pacific Power & Light in 1921. One of the outstanding rate experts of the Pacific Northwest, he filled a variety of posts with PP&L, including assistant general manager in charge of the Washington division and acting general manager. Myers, PP&L assistant secretary and assistant treasurer, has had the longest period of service in the company. His was the second name entered on the pay roll when the company started business in 1910. Recently he was made an honorary life member of the Northwest Electric Light and Power Assn., of which he is a former president.

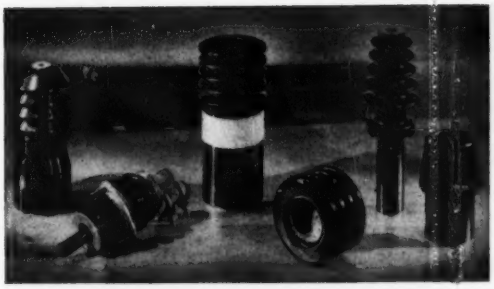
● **Carleton Thompson,** engineer in charge of lighting sales for San Diego Gas & Electric Co., has been conducting a series of classes on "Illumination Fundamentals," drawing upon the technical information from the lamp company's fixture manufacturers, etc. The class had approximately 48 registered including architects, draftsmen, electrical contractors, electrical engineers and electrical wholesale salesmen.

● **R. E. Hixson,** who has been handling sales promotion for the South Pacific division of General Electric Lamp Department in Los Angeles, has been transferred to sales operation division of the lamp department at Nela Park, Cleveland, Ohio. He is the son of retired former manager **Morris Hixson** of Oakland.

● **J. Walter Howard** on military leave from the Los Angeles division, General Electric Lamp Department, has been promoted to lieutenant-colonel in the U. S. Air Force. He is stationed with the Air Materiel Command in Chicago.

● **F. E. Gibson,** with Graybar in Seattle from 1920 to 1946, has been elected treasurer of that company. His headquarters will be in New York City. Since 1946 he had been district credit manager at Chicago.

● **Roy Lockhart,** for 33 years with Graybar Electric Co. in Los Angeles, retired recently. He joined Graybar in 1918, following a service in World War I, Canadian Princess Pat regiment.



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Put it up to Pinco!

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• If it's a production problem, Pinco's modern plant is geared to turn out, speedily and economically, unusual sizes and shapes in Pinco Porcelain . . . unexcelled for electrical and mechanical strength.

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PINCO INSULATORS

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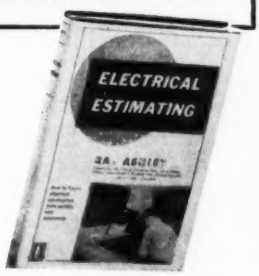
759 MAIN ST. · LIMA, N. Y.

ELECTRICAL CONTRACTORS AND ESTIMATORS

HOW TO ESTIMATE THE COST OF ANY ELECTRICAL JOB

HERE is all the information you need to estimate the cost of any electrical construction job . . . quickly and accurately. This manual is packed with time-saving methods, tips and guides that help you streamline your estimating procedures — give you the know-how that means safer and more dependable bids. It covers everything from the selection and training of electrical estimators and the proper use of estimating tools . . . to the cost of preliminary estimates and the preparation of final bid sheets. You'll find, too, helpful information on the design and use of estimating forms, the importance of weights and measures, and meeting special estimating requirements. Scores of sample estimates of actual construction costs make this book a "must" for anyone who wants at his fingertips the best in professional electrical estimating.



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30 AMP • SINGLE POLE TELECHRON MOTORED
Favorite of our Full Line!

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ALWAYS SPECIFY THE BEST
WHITER THAN WHITE
ABOLITE Lighting
• Industrial
• Commercial Floodlighting
• Pump Island Installations
The JONES METAL PRODUCTS CO.
WEST LAFAYETTE, OHIO
Sold Exclusively through Electrical Wholesalers

Manufacturers' Representatives

We are now compiling material for our April 1952 Manufacturers' Directory. Be sure all your principals have sent us listings of Western sales outlets as well as street addresses. ELECTRICAL WEST renders this service to the electrical industry without charge.

● **Paul B. Wilson,** Fresno, Calif., district manager for the Pacific Gas and Electric Co., is retiring at the end of the year, after 42 years with the utility. In 1909 Wilson joined the utility, then the San Joaquin Light and Power Corp., and served as district agent in Paso Robles and district manager in Madera before becoming Fresno district manager in 1922.

● **D. R. McClung,** vice-president of Pacific Power & Light Co., Portland, has been appointed director of the materials and equipment division of the Defense Electric Power Administration. He will go to Washington, D. C., on a six-month loan from the utility, which he has served for about 35 years.

● **George I. Long** has been elected vice-president and general manager of Ampex Electric Corp., with headquarters at the company's newly completed Redwood City, Calif., factory. He joined the organization in 1950 as treasurer and soon after was named vice-president. Ampex makes magnetic tape recording equipment for high-fidelity transcription.

● **Dewey W. Peterson** has been made vice-president and general sales manager of Henger-Seltzer Co. at 20 S. Hewitt St., Los Angeles, according to Ira Seltzer, president. Dewey has had a long experience in the electrical industry, including positions with Westinghouse Electric Supply Co. and the Electric Corp.

● **P. H. Fahrer,** former manager of the Los Angeles Product Service branch of A. O. Smith Corp., has been transferred to Chicago as assistant to the new manager, Charles Smith. **George Carlson,** former assistant manager of the Union, N. J., Branch, succeeds Fahrer at Los Angeles.

● **H. Norman Miller,** manager of the Westinghouse Portland office, was presented with a 25-year service emblem at a luncheon in San Francisco last month. The luncheon was part of a meeting called by **Walter J. Maytham,** Pacific Coast manager, in the company's Western headquarters.

● **W. E. Guy,** former Los Angeles sales manager for Graybar and now in Chicago, has been elected to the firm's board of directors.

● **W. J. Rashleigh,** one-time California division manager for Sylvania, has joined Unistrut Products Co. at Chicago.

Deaths

● **Lewis A. (Tam) McArthur,** long identified with electric power development in the Pacific Northwest and friend to many industry men and women, died in Portland Nov. 8. He became associated with Pacific Power & Light Co. in 1910, was named its general manager in 1917 and was elected vice-president in 1923, retiring in 1946. He was born in The Dalles, Ore., and was educated at Portland Academy and the University of California, receiving a Bachelor of Science degree in 1908. He was a life-long student and a recognized authority on Oregon history and geography. His Oregon Geographical Names, published in 1928 and revised in 1944, is a standard reference book. He served as a member of the Oregon Geographical board and as president of the Oregon Historical Society. He also was collaborator in maps and geography for the U. S. Forest Service, and was a fellow of the American Geographical Society of New York.

● **Lyle Bradford Robinson,** 58, an executive of the General Electric Co. at Seattle, died Nov. 1. He joined the company after graduation from the University of Washington in 1917, served during World War I as a captain in the Army and later a major in the reserve. He was in the electrical engineering department, specializing in illumination and transformers, and for many years was in charge of selecting college engineering graduates for jobs with General Electric.

● **Dr. Charles H. Prescott,** 51, a pioneer in development of electronic vacum tubes, died Nov. 1 of burns received in a flash fire and explosion a week earlier in the San Bruno, Calif., plant of Eitel-McCullough Inc. During World War II he had been in charge of the chemical section of the radiation laboratory at the University of California in Berkeley.

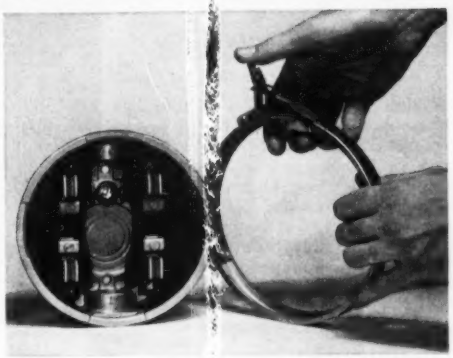
● **Elmer Ellsworth Bratt,** 76, a manufacturer's representative who organized the firm of Eicher & Bratt in Seattle, died recently. He was born in Pittsburgh, moving to Seattle in 1919.

● **Frank S. Hurst,** former president of the Electric Material Co. Inc., 605 Third St., San Francisco, died after a brief illness at the California Hospital in Los Angeles late in October.

● **Charles M. Strieby,** president of Strieby & Barton Inc., manufacturers agents in Los Angeles, died Oct. 26.

QUICK AND EASY TO INSTALL

Standard Meter Sockets



TYPE R FOUR-TERMINAL SOCKET covers almost all types of single-phase metering applications or ratings. It's easily mounted, has roomy space for wiring, also liberal current-carrying capacity.

QUICK-HITCH SEALING RING requires no tools for installation. With a simple snap of the ring, socket and meter are assembled. Socket with meter in place is sealed against the elements.

LESS MAINTENANCE, increased corrosion resistance, and longer life. Ask your G-E representative for full details or write for bulletin GEA-5147. Sec. 601-50, General Electric Company, Schenectady 5, New York.

GENERAL ELECTRIC

601-50

Keep Harmony between Trees and Wires

DAVEY LINE CLEARING BUILDS GOODWILL THRU QUALITY WORK

WESTERN HOME OWNERS prize their trees . . . select their tree service with care. That's why they always appreciate the quality and safety of line clearing by Davey. For Davey line clearing insures safety of life and property as well as the trees' welfare and is the best as well as the best known.

DAVEY LINE CLEARING

DIVISION OF

DAVEY TREE SURGERY CO., LTD. OF CALIFORNIA

Russ Bldg., San Francisco, SUtter 1-3377

Story Bldg., Los Angeles, TUcker 1929

DAVEY ORIGINATORS OF TREE SURGERY

NOTES ON THE TRADE

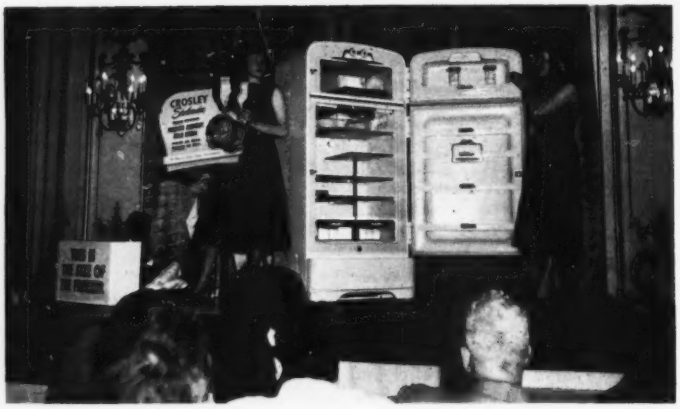
● **Fluorescent Fixtures of California** has appointed **Robert Thallon** head of the department of designs engineering, according to Charles E. Buchanan, vice-president. Thallon was graduated from Stanford University in electrical engineering and earned a Safeway post-graduate fellowship in illumination. He has been in electrical and illuminating design with Pacific Gas and Electric Co., Standard Oil, Kaiser Shipyards, U. S. Navy Yards and Douglas Aircraft. He is a member of the IES and holds associate membership in AIEE.

● **The General Electric** Lamp Division manufacturing plant at Oakland, Calif., is now using aluminum instead of brass bases on about 25% of its output. Presently the light metal is being used on only 60- and 75-w household lamps. Plant output consists of household lamps of 15 to 200 w. The NPA has sanctioned the use of aluminum for lamp bases, and the switchover is taking place at G-E lamp plants throughout the country.

● **Edwards Co.** is moving its San Francisco office from the George Gray Co. at 2720 17th St. to an office on the second floor at 671 7th St. District Manager **Robert Kempton** has been sharing offices with the George Gray Co. since Gray gave up the line. With Kempton will be **William Pierce** and **James Hursch.** Larger offices and warehouse stocks will be found at the new address.

● **General Electric Lamp** Division is building a new Portland headquarters for sales and service operations in the Pacific Northwest. Located at 2800 N.W. Nela St. in the Guilds Lake section, it will house offices of the division's North Pacific sales district, of which **C. A. Rost** is manager, and the Portland Service district, headed by **A. C. Ham.** The modern, one-story building will contain 40,000 sq ft of space, with 8,000 sq ft for office and the rest for warehouse facilities. It will be ready for occupancy by the end of the year. Henry M. Mason Co. is the contractor; Church, Newberry and Roehr are the architects.

● Appointment of **George H. Williams** as district sales manager of Scott Radio Laboratories in southern California was announced recently. He will be headquartered at 5600 Tuxedo Terrace, Los Angeles.



Redhaired twins show off Crosley's new Twin freezer-refrigerator with Shelvador in both doors, to the packed meeting of dealers at San Francisco's Fairmont, put on by California Electric Supply Co., distributors

● **H. B. Squires** Co. has been appointed Swivelier representative in northern California, according to Sam Russell, president of the company. This line was formerly handled by the Baxter Co.

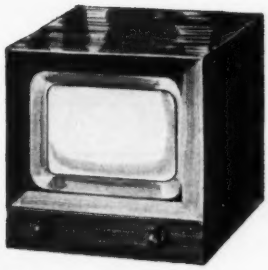
● **General Appliance** Co. and **Holm Appliance Service Co.** celebrated its twenty-seventh year in the appliance field and its third anniversary in its own building recently at 369 Fell St., San Francisco. Carl Hagstrom, president, and members of the staff acted as hosts at an open house Oct. 26.

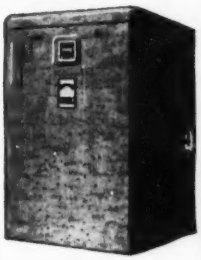
R. B. Hutton has joined the staff of Leach Relay Co., 5915 Avalon, Los Angeles. He had previously been with the Robert A. Young Co.

● **A. L. Haggard,** former sales manager for Given Mfg. Co. in the 11 Western states, has been appointed national sales manager of the company.

● **F. O. Bird** has started Bird Electric at 2264 Eton St., Vancouver, B. C.

Clever rubber balloon pump that trickle-charges distilled water into Sunbeam's new steam-or-dry iron, being shown to Alameda and east Oakland dealers by Jerry Manning, Eastbay representative, Sunbeam





How Many in 1952?

You can help maintain steel production . . . for military and civilian needs . . . by salvaging your iron and steel scrap—*now* and regularly.

Steel mill productive capacity is being constantly increased, and we *can* meet military and civilian demands . . .

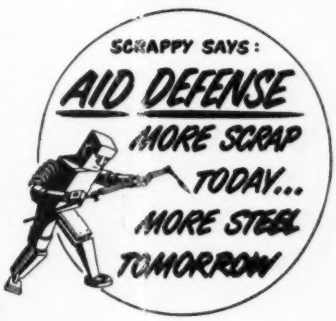
If we all pitch in and turn in our iron and steel *scrap*

Scrap is the scarce commodity. The amount of *working* scrap—the wastes of metal-working, such as trimmings, borings, etc.—is not enough for the enlarged furnace capacity.

It will take the *dormant* scrap to keep the furnaces running—old, outmoded machinery, equipment and parts that you've already "junked" or *can* junk because you have no further use for them.

We need extra millions of tons of scrap this year and next year. All of us can help by clearing out our plants and yards—*now*.

NON-FERROUS SCRAP IS NEEDED, TOO!



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ELECTRICAL WEST

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PROFILES

Butler

McClung

Donald Butler, recently made assistant superintendent of G-E's Oakland transformer plant. Don McClung, lent by Pacific Power & Light to DEPA. Carl E. Albracht, now in charge of public relations for the Westinghouse Western division, San Francisco

Albracht

Honest Injun, this is Merwin Brandon, who once tested meters for PG and E, hails from the South, and is now chief electrical engineer for Underwriters' Laboratories, Chicago, besides being chairman of the National Electrical Code Correlating Committee, NFPA. While attending the inspectors convention "Monte," as he is also called, inspected the old West as depicted at Knotts Berry Farm, where everything ancient but the electric wiring was brought down from the hills to decorate the place

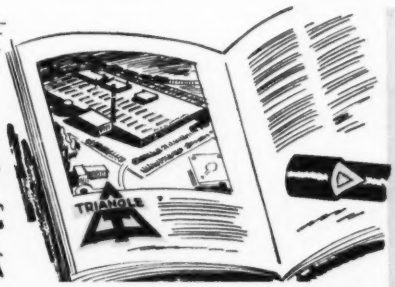
Charles A. Langlais (right) introduced his son Bill to the San Francisco Electrical Contractors Assn. He has joined his dad in the large-scale contracting he does

He's been getting in my hair for months!

Nice guy—but fussy—purchasing agents have to be. We're designing an addition to his company's jet plane factory. He drops in frequently to make sure he gets only top quality material. We specified Triangle wire, cable and conduit—everyone knows there's none better.

"Here's a sample of Triangle's Glazon," I told him. "It has a glass braid that won't rot, burn, absorb moisture or deteriorate with age. You can't take chances with electrical failures—especially in defense plants. We specify Triangle because we *know* it's right."

I showed him a piece of Triangle Rigid Conduit. "This conduit is galvanized in 99.83% pure zinc—and see that tough coat of lacquer? It's a special formula made to Triangle's rigid specifications. It gives *extra* protection. It won't chip or flake on bending, which means, no breaks in galvanizing—no rust—no corrosion."



I showed him a picture of Triangle's New Brunswick Plant. "Millions of feet of electrical wire and cable a month are produced here to fill defense orders. Their machinery and methods are the most modern I've ever seen. When they say, 'it must be right,' you know it *is* right."

I'm an electrical engineer, take a tip from me. Use Triangle.

ASK YOUR ELECTRICAL DISTRIBUTOR— HE KNOWS—

It MUST Be Right

THE TRADEMARK OF TOP QUALITY!

TRIANGLE CONDUIT & CABLE CO., INC.

NEW BRUNSWICK, NEW JERSEY

IT *MUST* BE RIGHT

"Glazon" Building Wire · "Glazon" Non-Metallic Sheathed Cable · Armored Cable · Service Entrance Service Drop, Varnished Cambric Braided or Leaded, Trioprene Trench, Power and Parkway Cables · Bare Wire · Rigid Conduit Hot-Dipped Galvanized and Black Enameled · Electric Metallic Thin Wall Conduit · Flexible Steel Conduit

Cole Electric Co.

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AIR BREAK DISCONNECTING SWITCH

115,000 volts—1200 amperes

Type O-2

Underhung mounting. Three-pole, single throw.

Group operated. One pole shown.

SILVER TO SILVER CONTACTS.

"Planned lighting helps our newsmen work better and feel better!"

—writes Irving Martin, Publisher of the Stockton Record

From editorial department to press room, the entire staff of the *Stockton Record* benefits from lighting engineered to banish eye-strain. Irving Martin, publisher of the *Record* writes: "Our work needs sharp concentration on the job at hand—particularly in the newsroom. We believe planned lighting helps our people work better and feel better." For a survey of your lighting, and ideas on how better lighting can help you, call the lighting engineer at your P. G. and E. office, or consult your contractor or engineer.

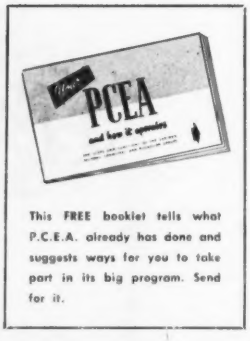
P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

ONE OF A SERIES OF ADS TELLING HOW YOU CAN MAKE YOUR P.C.E.A. MEMBERSHIP PAY DIVIDENDS

does your child suffer from bilateral fenestration?

Now Who's Bats?



This FREE booklet tells what P.C.E.A. already has done and suggests ways for you to take part in its big program. Send for it.

IN architectural parlance, "bilateral fenestration" means simply "glass windows on both sides"—as in a schoolroom. The idea is to let plenty of daylight in and eliminate electric lighting.

But it "ain't necessarily so." Your P. C. E. A. engineers of the School Lighting Committee concluded a one-year study of light levels in a so-called "modern" school. Their findings were that "B.F." is fine for bats but poor for children's eyesight. Soon a leading architectural magazine will publish the story of this study. Then watch "B.F." go out the window!

This is just another committee activity for P. C. E. A.— the "do something outfit." If you have problems, if you're a man of action, if you want to *do something*—come on in. We have lots of answers already, but we still have lots to do.

PACIFIC COAST ELECTRICAL ASSOCIATION

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